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BY

WILLIAM SQUIRE.

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DISEASES OF CHILDREN.

BY

WILLIAM SQUIRE, L.R.C.P. Lond.,

AUTHOR OF THE ARTICLES "CROUP" AND "DIPHTHERIA" IN REYNOLDS' 'SYSTEM OF MEDICINE.'

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TEMPERATURE-VARIATIONS IN THE DISEASES OF CHILDREN.

In prosecuting the investigations on the temperature-changes characterising the disorders of infancy, a large number of observations have accumulated, some of which may now conveniently be brought together, arranged, as much as possible, in the order that has guided me in this inquiry.

The object, foremost in my view, has been to gain a more definite idea of the natural history of the states of disease to which children are specially liable, and to illustrate the more leading features of the most marked and common forms of the acute specific diseases. As a consequence of this it is hoped that some addition might come to our certainty in diagnosis, and especially to our power of identifying at the outset those diseases most requiring early recognition. This is important, not only in the treatment of the individual, but for the protection of other members of a family and the community at large. There are also considerations of therapeutics and of hygiene which naturally follow, and are not unconnected with the line of observation pursued.

In some of the exanthemata the development of the eruption is followed by a fall of temperature, in others the temperature at this time does not show the same tendency to fall. Measles and scarlet fever being taken respectively as representatives of these two classes of disease, it may be remarked that in the one there is generally a long incubative period, that in the other this is generally short; in fact, the skin is the first tissue in the latter disease to be affected, though by no means the last, while in the former, as is well known, a catarrhal period of considerable severity, and of three or four days' duration, precedes the eruption.

In a previous paper instances were given to show the probability of the pre-eruptive period in measles being infectious, positive evidence can now be adduced to show that this period is not without temperature changes sufficient to give warning of the danger of infection before the rash, which in scarlet fever is warning sufficient, has had time to appear.

The temperature-changes for the initiatory stages of measles are given in the accompanying tables. These, and some others which follow, are of interest as indicating:

(i) By alterations both of pulse and temperature, an excitement of the system caused by the presence of the poison;

(ii) By a well-marked depression of temperature, the point from which the commencement of the disease may in reality be dated;

(iii) The special series of temperature-changes characterising the particular disease present.

TABLE 1.—*Pre-eruptive stage of measles. Morbilli.*

A girl, æt. 5 years, exposed to infection March 30th, cough on April 2nd.

Days of illness.	Date.	Pulse.	Resp.	Temperature in axilla.	Remarks.
4	April 3	110	26	98·6° noon	Slight cough and coryza.
3	„ 4	120	32	99·4° „	Eyes red, tonsils full.
2	„ 5	120	30	100·7° „	Doubtful mottling of parts of skin.
1	„ 6	104	30	99·0° „	Face mottled.
0	„ 7	100	26	97·3° „	Skin clear, slight cough.
1	„ 8	110	26	99·2° „	Respiration weak, a wheeze on forced inspiration.
2	„ 9	130	30	100·3° „	Ill, but not in bed.
3	„ 10	130	40	100·5° „	Respiration clear, spots of measles visible.
4	„ 11	...	...	102·0° „	Rash; purulent secretion from the conjunctiva.
5	„ 12	...	...	... „	Rash fully out, eyes better.

A boy, æt. 4 years, exposed to infection March 30th.

Days of illness.	Date.	Pulse.	Resp.	Temperature in axilla.	Remarks.
1	April 9	120	30	98·6°	Looks ill, frequent spasmodic cough.
2	„ 10	140	35	101·3°	No rash, wants to go out.
4	„ 12	...	...	102·6°	Spots appearing on temples, cheeks, and behind ears.
5	„ 13	...	...	103·0°	Full dark rash, face swollen; frequent vomiting.
6	„ 14	...	...	...	Defervescence; some desquamation in the following week.

An instance of measles being infectious before the eruption is given in the following case:

A child on a visit, leaves February 13th with symptoms of illness, but no signs of measles till the 15th; a girl, æt. 10 years, had slept with this child from the 9th to the 13th, and remained at home after her visitor had left; she seemed ill on the 20th, had chorea on the 23rd, with epistaxis in the evening, temperature 101·4°; rash of measles on the 24th, croupy cough at night, temperature 103·6; full rash on the 25th, croupy cough and tracheal sifle, temperature 104°; next day the temperature is only 98·7°.

Table 2.—*Morbilli.*

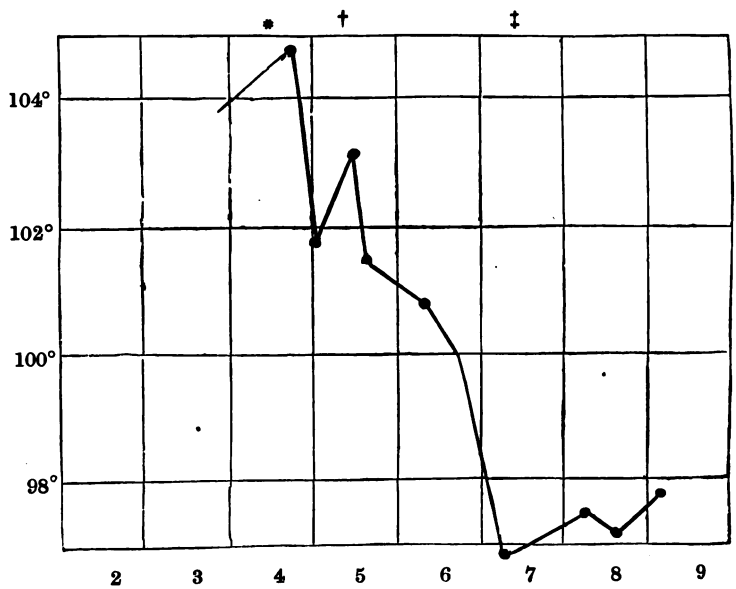
Case 1.—A boy, æt. 12½ years, exposed to infection March 20th, did not appear to be well on the 26th.

Days of illness.	Date.	Pulse.	Resp.	Temperature in axilla.	Remarks.
2	March 27	..	...	...	Cough.
3	„ 28	...	...	...	Ill, with hoarse cough.
4	„ 29	130	40	104·5°	Well-marked rash; delirium.
5	„ 30	130	40	101·6°	103° at 5 p.m. after wine; diarrhœa, 101° only at night, with very full rash.
6	„ 31	100	36	100·6°	Rash at fullest and darkest, slight cough, no diarrhœa.
7	April 1	108	36	96·8°	Rash less intense; râles at both pulmonary bases.
8	„ 2	96	32	...	Hoarse cough, appetite returning, takes wine.
9	„ 3	74	24	97·6°	Less cough, râles audible on forced inspiration.
11	„ 5	...	...	...	Seemed to be well; parotitis occurred on April 9.

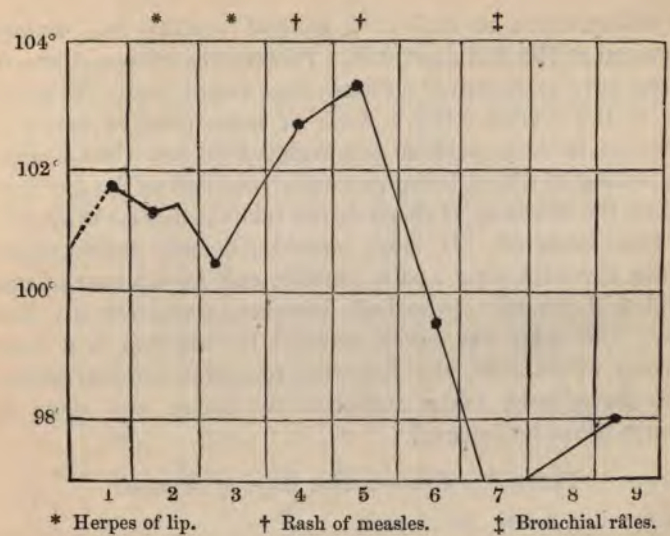
Case 2.—A boy, æt. $6\frac{1}{2}$ years, was with the boy whose case is last given from March 26th to March 30th.

Days of illness.	Date.	Pulse.	Resp.	Temperature in axilla.	Remarks.
1	April 5	120	40	101·8°	Does not feel ill; conjunctiva red, tonsils full.
2	„ 6	100	40	101·5°	Small red spots on lip and cheek.
3	„ 7	110	30	100·5°	Herpes of lip and cheek.
4	„ 8	130	40	102·6°	Seems ill; rash of measles at night.
5	„ 9	130	50	103·3°	Full rash on face and shoulders.
6	„ 10	120	30	99·5°	Body covered with rash; perspiration.
7	„ 11	...	...	97·4°	Tongue furred; some bronchial râles.
9	„ 13	...	...	...	Convalescent; no râles.

These two cases may be represented in diagrams thus:



* Rash of measles. † Wine given once.
‡ Bronchial râles, wine repeated.



Parotitis.—Mumps is the most nearly related to measles of the acute specific diseases. The period of incubation is even longer; a fortnight generally passes between exposure to infection and the full development of the disease; and where no attempt has been made to obviate sources of infection, or where the child, after mumps, has returned to the family too soon, an interval of two months has been known to elapse between the one case and the next: this, however, is the longest that has come under my notice.

Under my observation, the interval from complete separation from all sources of infection to the first symptom of disease has been nineteen days, though the time passed in that instance after the greatest exposure to infection was twenty-two days. Exactly this time elapsed from removing a child with mumps, who had been three days in the house, before a servant remaining in the house felt the first symptom of the disease.

The whole of this intervening period has not been occupied by temperature-observations. Occasional fainting, and a feeling of weakness occurred in a delicate girl for nearly three weeks before mumps was declared. Once, on a wound showing

an indisposition to heal in a general healthy lad, mumps appeared at the fortnight end. In some cases symptoms of illness have been noticed for more than a week before the swelling of the glands. For a week or more after exposure to infection there is seldom any evidence of disturbed health, the feeling of illness being generally confined to the day preceding the swelling. Infants do not take the disease as readily as older children. It may, however, be well characterised at the age of a year and a quarter, and in the case of one child still younger (who had, however, completed his first year), and who was much exposed to infection in a large nursery of children, the following temperature-observations were for a week taken consecutively before any signs of mumps could be detected.

TABLE 3.—*Pre-eruptive stage of Mumps.*

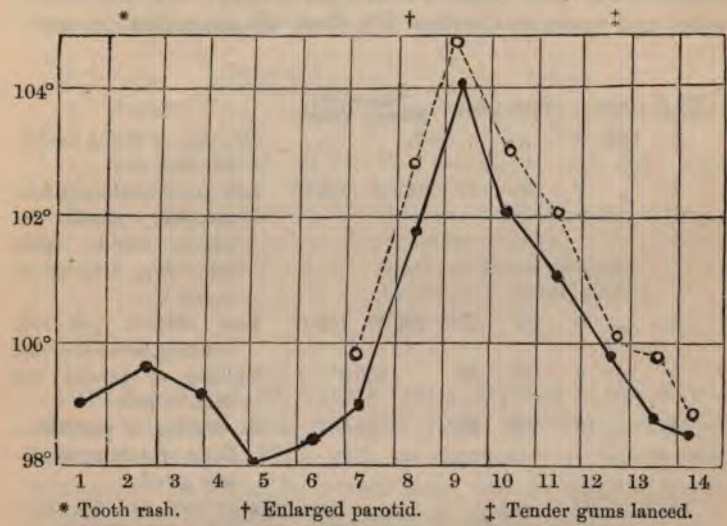
CASE 1.—A boy, æt. 1 year.

Day of illness.	Date.	Temperature.	Remarks.
—3	April 7	99·0° axilla	Two upper molars at gum, red spots on arm.
—2	„ 8	99·5° „	Small spots of herpes or strophulus on arm.
—1	„ 9	99·2° „	Seems well, no other spots on skin.
0	„ 10	98·0° „	
1	„ 11	98·6° „	
2	„ 12	99·6° „	Excitable.
3	„ 13	101·8° „	Vomited, parotid glands first perceptible.
4	„ 14	104·7° *in recto* at night.	One submaxillary gland affected.
5	„ 15	102·0° axilla	Seemed ill all day.
6	„ 16	101·0° „ 102 *recto*.	
7	„ 17	99·6° „	Some swelling of both sides of face.
8	„ 18	98·6° „ 99·7° *recto*.	Herpetic spots near left ear.

Point of left upper molar at gum and corresponding gum on right side full, both lanced; child well.

Of these fourteen days of pyrexia, the first three and the last two were probably owing to the teeth; there were, however, five days consecutively febrile, and it was not till the third of these that the child obviously had mumps.

This case is thus represented in diagram.



The dotted lines in this and a subsequent diagram represent the temperature *in recto*.

In this case, what might be the import of that temperature nearly of 105°, had it not been known that the poison of mumps was maturing in the system and would probably be cast off with no greater accident than a special irritation of certain fibrous and glandular structures? and is it not evident that the special affection of these glands is the final result and consequence of the illness under notice, and not the cause of the illness? It has seemed that in some cases the salivary secretion, as well as those of the mouth and throat are deteriorated; not only is there a peculiar odour from the mouth but ulceration at the orifice of the salivary duct has been noticed in the course of the disease.

TABLE 4.—*Mumps.*

CASE.—A boy, æt. 13 years, at home for the Michaelmas holidays, exposed to the infection of mumps at school, had

not seemed in his usual health since he left; he became easily tired. On October 1st, after a long walk, had headache, and again on October 5th, from no assignable cause.

Day of illness.	Date.	Pulse.	Resp.	Temperature. Morning.	Temperature. Evening.	Remarks.
1	Oct. 6	...	...	...	...	One side of throat tender, and neck stiff.
2	„ 7	100	24	101·2°	103·0°	Left parotid and right submaxillary glands enlarged, bowels open, urine free, delirious at night.
3	„ 8	110	27	102·4°	102·4°	Face swelled, eyes red, vomiting, better at night.
4	„ 9	84	26	100·2°		Swelling of parotid less hard, no pain.
5	„ 10	68	24	98·4°		No swelling of parotids, a little of left submaxillary gland.
15	„ 20	...	...	...	...	Quite well, had felt weak till now, no metastasis, no relapse.

Cases.—A boy at home ill with measles on April 1st, has mumps on April 9th; four younger children in the house are in the same room with him from the 5th to the 9th, and after the 11th of April.

Case 1.—A girl, æt. 11 years, not having looked well for a day or two is restless at night, and has pain under the ears on April 22nd.

Day of illness.	Date.	Temperature. Morning.	Temperature. Evening.	Remarks.
2	April 23	100·0°	101·0°	Swelling of both parotids, and pain.
3	„ 24	98·8°	...	Much swelling, pain relieved.
4	„ 25	97·2°	...	Glands still painful.
5	„ 26	...	...	Nearly well, perspired at night.
8	„ 29	...	...	Not febrile, relapse, submaxillary glands affected.

Case 2.—A girl, æt. 9 years, who had not looked well for nearly a week, is slightly febrile on April 22nd, has signs of mumps on the 24th.

Day of illness.	Date.	Temperature. Morning.	Evening.	Remarks.
1	April 23	...	99·4°	Slight swelling of both parotids, right most.
2	„ 24	100·7°	100·9°	Face flushed, left eye pink, severe pain.
3	„ 25	98·5°	...	Great swelling of both sides; is hungry, but cannot eat.
4	„ 26	97·7°	...	Great redness and swelling.
5	„ 27	..	...	Swelling less, redness persists.
6	„ 28	...	...	Epistaxis.

Case 3.—A girl, æt. 8 years nearly, exposed to infection of mumps on April 9th, has the right parotid perceptibly enlarged on April 23rd, with no complaint of illness until awoke in the night by severe pain, she is languid in the morning and excitable, but not ill at night.

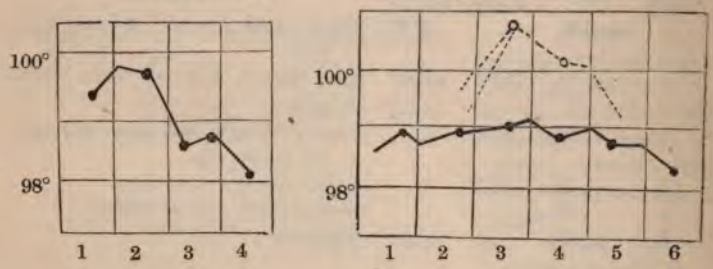
Day of illness.	Date.	Temperature. Morning.	Evening.	Remarks.
1	April 23	98·2°	99·6°	Severe pain in the night.
2	„ 24	99·2°	98·6°	One parotid tender, the schlerotic of one eye pink.
3	„ 25	98·5°		Both sides swelled, severe pain in right ear, chloroform given.
4	„ 26	97·1°		Pain on left side.

Case 4.—A boy, æt. 6¾ years, same exposure to infection, had swelling of the right parotid on April 25th with a temperature of 100°, pulse slightly quickened, respiration not affected, no complaint of illness, is sent to bed; April 26th no pain, not much appetite, temperature 100·7°; next day there is swelling commencing on the left side, no pain, pulse 100; respiration 24; temperature 99°. There was considerable swelling during the next three days, but no pain and no fever.

When separation and isolation have been carefully carried out, it has seemed that a milder course of the disease has

followed, at least when the health of the child was not defective.

Diagram of two mild cases of parotitis.



A little girl, five years old, was sent from home on March 14th, because her brother came from school on March 11th, with an illness which proved to be mumps; on March 28th she felt slight soreness of throat in eating her dinner; by night the right parotid was swelled and painful, temperature 99·4°. 31st.—Pulse 80; respiration 20; temperature 98·2°; and though some swelling might be noticeable for nearly a week, no subsequent febrile disturbance could be detected. A younger brother three years old, who went from home at the same time to another house, was first noticed to be amiss on April 2nd and was restless at night; 3rd, complained of throat, swelling doubtful, febrile at night; 4th, both parotids palpably affected. Pulse 120; respiration 18; temperature in recto 100·6°; axilla 99°; but neither in the mouth nor at the sides of the neck could a temperature of 99° be obtained; 7th, submaxillary slightly affected, temperature 98·4° axilla.

This child was subject to sudden rises of temperature from apparently trivial causes; he suffered severely with both measles and whooping-cough, and might have been expected to show considerable temperature disturbance in this complaint, had he not had the benefit of change of air and excellent hygienic provision. He subsequently afforded an instance of the positive lowering of temperature the day before the appearance of the eruption of varicella.

In several cases a higher temperature has been obtained at the neck or in the mouth on the side affected than in the axilla, affording a fallacious support to the idea that the general temperature, and so, inferentially, the general disease was excited by, or was a consequence of, the local lesion. The case first given, and this last case, afford strong evidence the other way. If the febrile excitement be not to a high degree, the general temperature is not always readily obtainable in the axilla; even in the last case the axillary temperature, though in excess of that in the mouth, was a degree and a half below that of the rectum: it may be generally stated that the local temperature will not be found to be in excess of, or even equal to, the general temperature, if that can be effectually obtained.

A wave of low temperature preceding the development of many of the acute specific diseases, for which priority of observation may be claimed, has been demonstrated in the early stages of measles, mumps, varicella, vaccination, and whooping-cough. This period of depression does not coincide with the chill or rigor ushering in most acute diseases, for that occurs only when a considerable elevation of temperature is already established, while this is prior to the rise of temperature excited by the progress of the disease. Up to this time it is conceivable that the poison of a disease might be thrown off harmless from the system, and the process of infection might be interrupted, but not afterwards. This puts a period to the true incubation stage, and marks the commencement of what is generally called the stage of invasion, but which ought strictly to be considered as part, and a most essential part, of the disease itself.

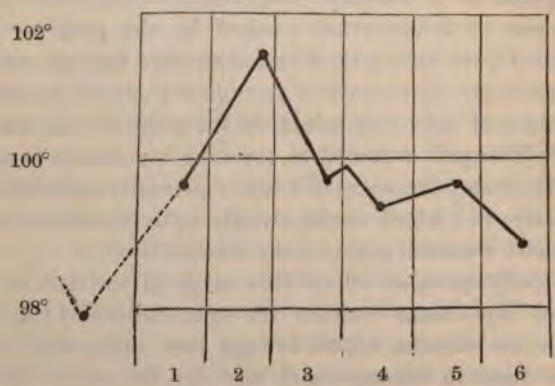
The early recognition of this stage is insisted on as of practical importance both for the safe conduct of the patient through the disease, which though now impossible to avert is more easy to manage, and also for the safety of others in guarding them against infection before it is too late.

Varicella.—In chicken-pox the rise of temperature accompanies the first appearance of the spots, and falls after the

eruption is developed though it is somewhat elevated as long as any fresh spots appear. The illness precedes the eruption by a few hours only; generally it is indicated by some papular red spots as soon as the illness is felt, and it has but once occurred to me to find any elevation of temperature without also finding indications of the eruption. Observations made during the period that intervenes between exposure to infection and the appearance of the disease have afforded no more marked result than that the positive lowering of temperature, occuring at the commencement of most of the acute specific diseases, is here noticed on the day which precedes the more characteristic signs of the disease. Some symptoms of illness, such as pallor, and increased frequency of the pulse, may be at the same time noticeable.

The incubation period of varicella may be given as ten days; it is at least eight or nine days, as stated by Heberden; and at most, a fortnight or even seventeen days, as stated by Trousseau, may elapse from the beginning of infection to the appearance of the disease.

TABLE 5.—*Varicella.*



CASE 1.—A girl, aged 8 years, attending a day school, is seen with a characteristic spot of varicella on the upper lip, with others in the throat; she remained at home, and on the

following day there are numerous spots, with nocturnal fever; the fever continued next day, and was at 101° the day after, when the earlier and more considerable spots were drying; fresh small spots continued to appear on the two following days with diminishing febrile action; six days were febrile. A brother, aged 3 years, whose case is represented in the diagram, remaining in the house and occupying the same room had the first symptoms of the illness fourteen days from its commencement with his sister, and ten from the day of greatest fever, when she remained in bed. Two other children in the family sickened on the following day.

A woman who had been assisting in a room where there was chicken-pox, spends an afternoon in the end of November with her sister, living at the distance of half a mile, who has two children at home; the younger (Case 2), a girl aged two years and eight months, was restless in the night of December 14th, she had some red spots on December 15th, and was seen by me December 16th with well-marked chicken-pox. The pulse was 180. Respiration 40 to 60 in the minute. Temperature in the axilla 101°; next day, pulse 120, respiration 30, temperature 100°, with but few new spots. On the 18th the spots were drying and there was no increase of temperature at night. On the 19th the pulse was 100, the respiration 30, the temperature 98° only.

Case 3.—A boy, aged six years and ten months, with his sister throughout, was restless in the evening of December 27th, when one spot was detected on the head; he vomited in the night. On the 28th several spots appeared; pulse 120; respiration 24; temperature 101·3°. Next day pulse 100, respiration 26, temperature 99·7°; he was able to eat a chop at dinner; there were a few new spots; one or two of these on the chest and upper arm were rounded, flat, pellucid, with drying, if not depressed centres, and some areola; all the others were very characteristic of varicella. Here, at apparently the height of the disease, there was a fall of more than a degree and a half of temperature, though the boy had been kept warm in bed. On December 30th two

new spots, full, opaque, of rounded outline, with red edges, appeared on the nates. Temperature 99·2°. December 31st, pulse 110; respiration 30; temperature 99·5°; one new spot, the last two are turbid; next day pulse 100, respiration 30, temperature 98·5°, and the disease was over.

Case 4.—A younger brother, 5 years old, out to nurse under unfavorable hygienic conditions, was sent home on January 12th on account of another child in the same room with him being ill with chicken-pox. He showed the first symptoms of lassitude on January 21st, and a few spots were seen near the mouth that evening; the next day, and the day after very numerous vesicles were developed; he had a full and characteristic eruption, but seemed so little ill that he was not kept in bed; partly owing to this, and still more to the low state of health to which he had been reduced before the illness, he suffered afterwards with most intractable sores, which were not all healed on March 2nd, when he had again to leave home, nearly six weeks after the illness.

Rubeola.—Rosalia, or epidemic roseola, is nearly allied to measles, not only by a superficial resemblance, but also by having a long incubative period, and by culminating in a speedy subsidence of temperature on the appearance of the rash. The period of incubation, as elsewhere stated,[1] is from eight to ten days; the stage of invasion is short, and, so far as it has been possible to trace the temperature-variations during the pre-eruptive period, affords another illustration of how small is the disturbance created in the system by this class of zymotic poisons, of which vaccinia is the type, until the time has arrived for their ultimate development and expulsion. This is very striking in the form of exanthem to which the name of rubeola (as distinct from morbilli or true measles) ought to be restricted. Not only has no temperature disturbance been obvious until the night preceding, or the morning of, the rash, but there has been exceeding rapidity of both the rise and fall of temperature when this has been

[1] 'British Medical Journal,' 1870, vol. i, pp. 99, 100.

much disturbed. Once it reached 102° on the first day, was 101° on the second day, and below the normal on the third, with the rash still out. Where the disturbance has been less marked, a slight elevation of temperature has been noticed a day before the rash, has reached 100° on the day of the rash, was 99·6° on the second day, and 98·7° on the third, with traces of rash still on the face.

The great distinction between rubeola or rosalia and measles is the absence of the catarrhal stage of invasion; the appearance of the rash is generally closely similar. In a variety of this exanthem, having the same incubative period, the rash, instead of appearing like measles, presents a finally diffused redness which, except that on the face it has a more rosy hue, could not be discriminated by the most experienced and careful observer from the rash of scarlet fever, though differing from it absolutely as measured by temperature. The temperature change accompanying this form of rubeola is even slighter than in the other; it precedes the rash by a few hours, and has often quite subsided when the rash is most conspicuous, so that, at the time of the greatest redness, the temperature has by evening become normal, or been found at, or even below the normal.

Another class of acute specific diseases characterised by the shortness of the incubative period and the irregularity of the subsequent temperature changes, comprises diphtheria, croup, scarlatina, relapsing fever, cholera, summer diarrhœa, influenza, and whooping-cough. Temperature-changes for the two first of these diseases have been already given;[1] the high temperature marking the course of choleraic or summer diarrhœa in infants is described in a previous paper.[2]

Scarlatina.—Scarlatina, or scarlet fever, may be taken as the type of this class. As illustrating the shortness of the incubation period, instances of twenty-four hours (Trousseau) and of less than twenty-four hours (Murchison) have been

[1] Reynolds's 'System of Medicine,' 2nd edition, 1870, vol. i, pp. 118—120, 139; also pp. 79, 80, 84.

[2] 'Obstetrical Transactions,' vol. x, pp. 285—6.

ascertained; the duration of this period may extend to five days; the period of invasion is from three to thirty hours only. In scarlet fever, though the highest temperature often corresponds with the height of the rash, there is no necessary fall of temperature with the fading of the rash; and though at the height of the rash the temperature is high, and is often at its height at the end of the first week of the disease, yet with no other complication than stomatitis or coryza, it has continued at 101° and 102° up to the end of the third week.

Tables of the lowest ranges of temperature met with in undoubted cases of scarlet fever are here given for comparison with temperature variations in allied diseases: the normal range of temperature in the third case, not a mild one, is evidently controlled by the use of quinine.

TABLE 6.—*Scarlatina mitior.*

CASE 1.—Girl, æt. 2 years and 10 months.

Day of illness.	Date.	Temperature. Morning.	Evening.	Remarks.
1	March 2	...	...	Fretful, ill at night.
2	„ 3	102·0°	...	Full rash.
3	„ 4	102·0°	...	Tonsils full.
4	„ 5	100·8°	...	
5	„ 6	...	100·0° 3 p.m.	
6	„ 7	99·2°	99·0° only, at night.	
7	„ 8	Normal.		

CASE 2.—Boy, æt. 8 years.

Day of illness.	Date.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
1	Dec. 8	140	30	...	102·2°	Rash on neck and chest, arch of palate red.
2	„ 9	...	...	101·2°		
3	„ 10	...	...	100·6°		
4	„ 11	...	...	100·0°		
5	„ 12	...	...	99·6°	100·0°	
6	„ 13	...	...	...	100·0°	Epistaxis.
7	„ 14	...	...	99·6°		
8	„ 15	...	...	98·4°		
9	„ 16	...	...	...	101·0°	Constipation.
10	„ 17	...	...	99·0°		
11	„ 18	...	...	98·4°	...	Some secretion from right ear, slight deafness.

Scarlatina.

CASE 3.—A boy, æt. 4 years. Temperature changes arrested by quinine.

Day of illness.	Temperature in axilla. Morning.	Evening.	Remarks.
1	...	...	Vomited at night.
2	...	102·0°	Rash on face and chest, palate red.
3	103·0°	...	Half a grain of quinine three times a day.
4	100·8°	100·4°	
5	98·6°		Stop quinine, an aperient given.
6	99·4°	100·1°	Resume quinine.
7	98·6°	99·8°	Tonsils full.
8	99·4°	...	To take iron with smaller doses of quinine.
9	...	99·0°	Castor oil given.
10	...	98·4°	Takes food well.
12	Defective vision, ciliary muscles paralysed (?), tonsils full.		
15	Improving; thick, glairy mucus at back of pharynx.		
32	Desquamation complete; some paralysis of abdominal muscles.		
38	No action of bowels since last report; convalescent.		

The following case (4), and the next but one (Case 6), show the influence of quinine and the inutility of alcohol in checking the tendency to high temperature during the course of scarlet fever.

CASE 4.—A boy, æt. 2½ years. Suffered from congestion of left lung six months before.

Day of illness.	Pulse.	Resp.	Temperature in axilla. Morning.	Evening.	Remarks.
1	...	...	...	...	Restless, rash, seemed well the day before.
2	130	35	99·4°	...	100·4° *in recto*; throat red, rash fullest over the back.
3	...	...	99·6°	...	Rash extends to legs, uvula red; sleeps well at night.
4	130	...	100·2°	...	Rash most on thighs; glairy mucus from one nostril.

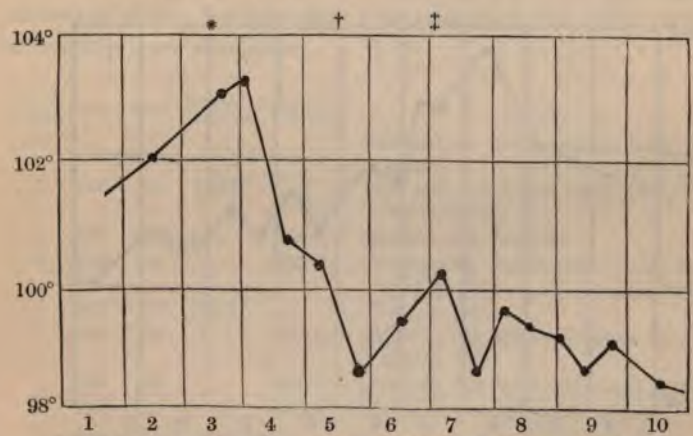
Day of illness.	Pulse.	Resp.	Temperature in axilla. Morning.	Evening.	Remarks.
5	130	30	101·0°	...	One tonsil full, eats and sleeps well, excreta natural.
6	120	30	100·2°	...	Throat better, no coryza.
7	130	30	102·2°	...	Is restless, looks pale.
8	130	40	101·6°	...	Congestion at base of left lung; to be poulticed.
9	120	40	100·4°	...	Respiration audible at base, restless at night; wine given.
10	120	50	101·4°	102·0°	Enlarged cervical gland; to take quinine 1 gr. in powder.
11	120	40	98·4°	99·1°	*in recto* at 4 p. m. Slight alcoholic stimulant.
12	120	40	99·2°	101·3°	Fulness of neck on both sides; 1 gr. quinine repeated at night.
13	120	36	98·0°	...	98·5° *recto;* a little wine and water allowed.
14	100	30	98·0°	...	Less swelling of cervical glands.
15	...	...	...	...	To take steel wine and cod liver oil.
20	100	30	97·9°	...	Seems well; swelling of neck almost gone, cervical glands still perceptible, signs of fine desquamation on hands and feet, skin otherwise clear; has not left the room.
41	120	30	...	...	Submaxillary gland still perceptibly enlarged; the bowels generally acted freely, often disturbed, urine deposited lithates, never albuminous.

This child had been kept indoors three weeks longer than necessary for his own health.

Had the pyrexia on the tenth and twelfth days not been arrested the swelling of the cervical glands would probably have then become a serious complication. The good effect of quinine, as contrasted with that of alcoholic stimulants, was at that time very obvious.

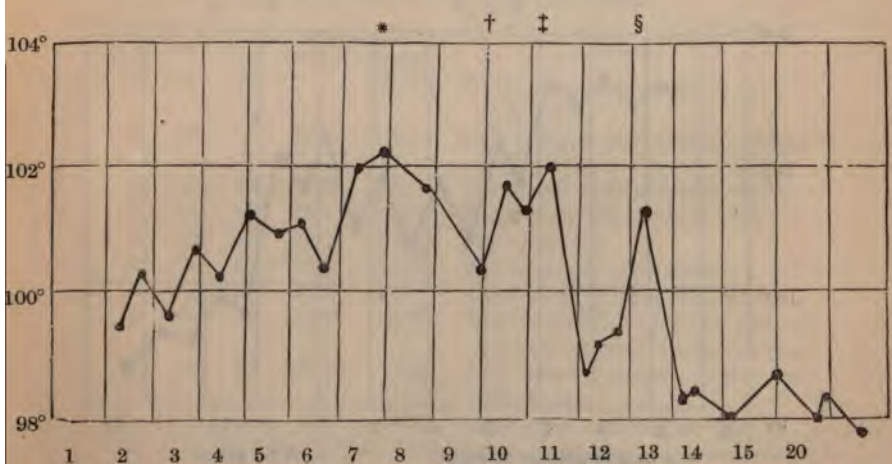
Diagrams of Scarlatina.

CASE 3.—A boy æt. 4 years.



* Quinine given, 3 grains. † Stop quinine. ‡ Resume quinine.

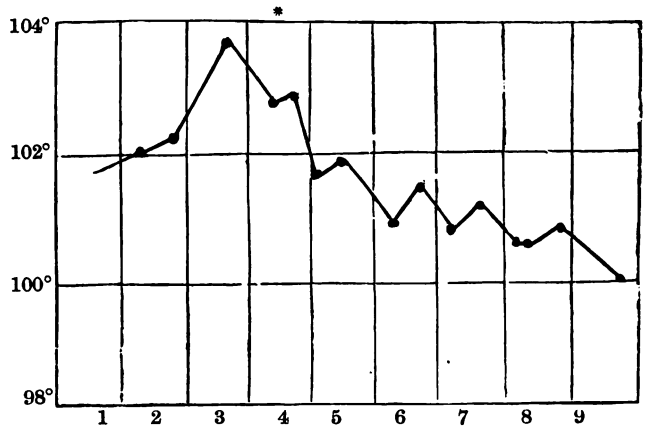
CASE 4.—A boy æt. 2½ years.



* Congestion of lung. ‡ Quinine given, one grain in powder, and repeated twice.
† Port wine given. § Resume quinine one grain at night.

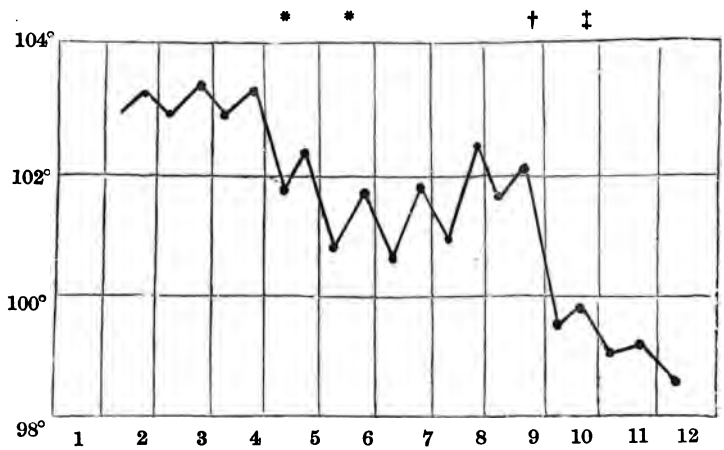
Diagrams of scarlatina.

CASE 5.—A girl æt. 3 years.



* Quinine given.

CASE 6.—A girl æt. 7 years.



* A dose of quinine at night. † Wine given.
‡ Quinine given regularly.

Table 6.—*Scarlatina.*

Case 5.—A girl, æt. 3 years. Has been hoarse, and complained of throat for four days; two sisters in the same room recovering from scarlatina.

Day of illness.	Pulse.	Resp.	Temperature in axilla. Morning.	Evening.	Remarks.
1	...	...	...	...	Vomited in the morning, fever at night.
2	140	34	102·2°	...	Full rash, palate red, temp. 101° only in the mouth.
3	180	40	...	103·6°	Sickness and diarrhœa.
4	170	40	...	102·8°	Tonsils full, throat sore; iron and quinine given.
5	160	34	101·7°		Throat better.
6	120	34	...	101·2°	Skin very red, harsh; enlarged cervical glands.
7	120	30	...	101·0°	Skin red, soft, less swelling over gland.
8	120	30	...	100·8°	Better, lips cracked and sore.

Continued to improve.

Case 6.—A girl, æt. 7 years. After complaining of the throat for a day or two is seized with vomiting.

Day of illness.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
2	120	40	...	103·0°	in the mouth, probably more on surface, slight rash.
3	120	30	102·8	103·1°	102·9° at night, after a third action of the bowels.
4	110	30	102·8°	103·2°	To take acid medicine in place of saline.
5	110	30	101·8°	102·2°	A grain of quinine given at night.
6	108	26	100·8°	101·7°	Repeat quinine.
7	108	28	100·5°	101·8°	Bowels confined, no medicine.
8	108	30	101·0°	102·4°	Claret given, no action of bowels.
9	100	30	101·6°	102·1°	Bowels relieved; to take one grain of quinine, and repeat it in the morning.
10	100	25	99·4°	99·6°	Some fulness of tonsils; to take iron and quinine.
11	100	24	99·2°	99·4°	Constipation; relieved by castor oil.
22	Very free desquamation; a tendency to constipation; no albuminuria at any time.				

The effect of quinine in controlling the high temperature of scarlet fever is still more marked in a case of great severity which concludes this series. The brother of the little girl whose case is last given, had been some months in the country, detained there the last two, in consequence of his sister's attack of scarlet fever at the end of August, returns on October 9th and is put to sleep in the room in which his sister was ill, the room and the bedding had undergone a thorough purification, but the curtains which had surrounded the little girl one night only at the commencement of her illness had been put away since August 30th, after only a few days' exposure to the air, and were now hanging in alarming proximity to the face of the present patient. Four younger children, and a girl, fifteen years old, in the nursery, never having had scarlet fever, remained in the house throughout without showing any symptoms of illness; moreover, the convalescent sister had returned to them seven weeks from the commencement of her attack, but no one but this boy takes the illness.

The ingress of the pyrexia was as sudden as it could possibly be; the child was observed at 2 o'clock in the afternoon to be seemingly in the most robust health, and by six in the evening he was obviously ill with a severe attack of scarlet fever. Whether this is from his sister or from the curtains under which he slept (though in neither case need the germ have been imparted long before) the cause of infection must be considered as acting continuously, and the effect is not produced until ten days from first exposure.

Case 7.—A boy, æt. 8¾ years, suddenly seized on October 19th, in the evening, with headache, sore throat, and vomiting; has the rash of scarlet fever by night, with high fever and delirium.

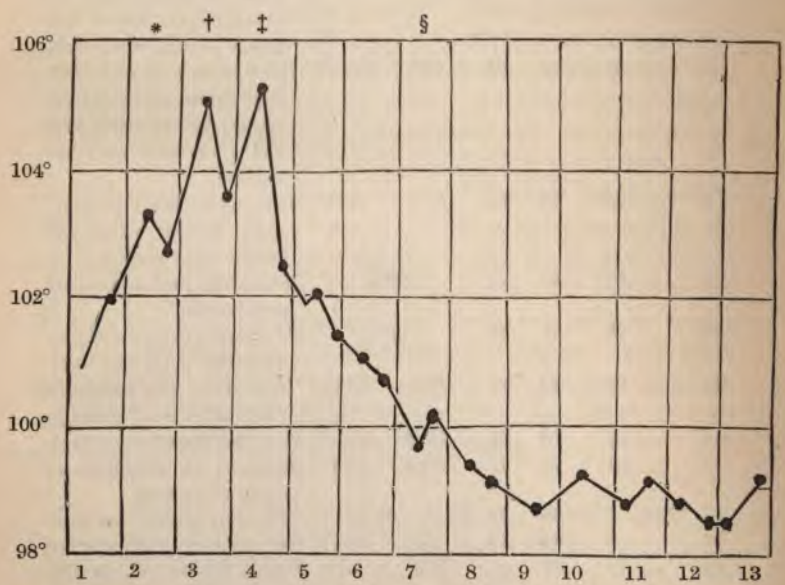
Day of illness.	Date.	Pulse.	Resp.	Temperature in axilla. Morning.	Evening.	Remarks.
	Oct. 19	...	...	...	...	...
2	„ 20	130	46	103·2°	102·5°	Full, dusky rash, bad throat, muscular twitchings at night, and great prostration.

Day of illness.	Date.	Pulse.	Resp.	Temperature in axilla. Night.	Morning.	Remarks.
3	Oct. 21	140	48	105·0°	103·5°	One grain of quinine given at noon, not repeated at night; delirium.
4	„ 22	128	40	105·0°	102·2°	Three grains of quinine in the afternoon and two at night, with ice to the head.
5	„ 23	100	30	102·0°	101·2°	Slept well, quite cheerful and intelligent to-day; rash less intense, throat freer from sordes, redness of left tonsil, glands tender.
6	„ 24	100	28	101·0°	100·7°	Urine passed twice to-day for the first time; swelling under left ear, ulcer of left tonsil, red swelling of soft palate, exudation on uvula.
7	„ 25	92	26	99·7°	100·1°	Petechiæ on neck and chest, restlessness last night extreme; to commence wine and take steel with the quinine.
8	„ 26	80	28	99·4°	99·0°	Slept well, throat clearing, ulcer healed, much less swelling of glands.
9	„ 27	80	24	98·7°		Takes solid food and wine; stop quinine.
10	„ 28	88	26	99·1°		To resume one grain of quinine twice a day with steel.
11	„ 29	80	24	98·8°	99·1°	Urine free, with excess of phosphates, no albumen.
12	„ 30	76	22	98·8°	98·6°	Fine desquamation on chest.
13	„ 31	72	22	98·6°	99·1°	Tendency to constipation; discontinue steel.
15	Nov. 2	88	26	99·5°		Uric acid; to take less wine.
21	„ 8	84	24	...	99·1°	Desquamation everywhere.
25	„ 12	84	...	98·7°	...	Slight fulness of cervical gland remains.
34	„ 21	84	26	99·1°		Some fulness of tonsils; to go out.

Here the intensity of the disease necessitated a large quantity of quinine, which did not cause either deafness or other inconvenience; quinine seems to control any tendency to vascular or other excitement that might be occasioned by

the free use of wine; this is traceable both on the seventh and tenth days. The most marked benefit from it is seen at the very height of the fever, when, the general pyrexia being under its control, the heat of head and restlessness at night were readily subdued by the application of ice, and good sleep followed. Next day the intelligence, cheerfulness, and perfect memory displayed make it impossible to suppose that any cerebral congestion had resulted from the remedy, or any cerebral injury from the pyrexia.

Diagram of scarlet fever influenced by quinine.



* Muscular twitchings, great prostration. † One grain of quinine only given.
‡ Three grains of quinine given and repeated.
§ Wine commenced and given freely next day.

The effect of quinine in scarlet fever is seen in this diagram of the case under consideration. Six grains of quinine in one day and three grains on subsequent days

sufficed here; from fifteen to forty grains are often requisite in older persons; the latter quantity has been given in one night with most marked benefit to a boy of sixteen, where fever from another cause was running high. Scarlet fever in the puerperal state requires the largest doses in combination with the stronger forms of iron. Albuminuria has rarely followed in the cases of scarlet fever that have been selected for careful observation, nor as yet, it is worthy of remark, has acute albuminuria been observed in those treated by quinine. After complete devervescence, albumen has appeared, with desquamation of the renal epithelium in one case partially treated in this way.

In reducing the high temperature on which the chief danger not only to life, but to the integrity of the tissues, in these diseases, depends, quinine is as powerful a remedy as cold affusion, and is much more convenient and serviceable; it is nearly as efficacious in typhoid fever, when, the pyrexial period being more prolonged, the cerebral disturbance is greater: how much of this might have been prevented by its use in cases that come to mind! Once in a child convalescent from typhoid fever loss of memory was so complete that whole weeks remained a blank. Cinchonine has a similar influence, as is illustrated in a case of typhoid fever given at the end of this paper.

The communication of scarlet fever from one person to another in the same household, even where there are several children, is generally preventible. To effect this the general requirements are a separate room for the sick, bared as much as possible of furniture; a sheet or linen curtain, on which disinfectants can be sprinkled, suspended over the door, and the removal of any carpet or rug from the outside of the door of the sick room; strict cleanliness within the room; the immersion in water containing a disinfectant of whatever has to be removed from the room; an intelligent attendant, and a sufficiently prolonged isolation of the patient. Olive oil containing one twentieth part of carbolic acid, applied to the skin, is useful; in the earlier part of the illness it is grateful to the patient, in the latter part it obviates some of the dangers attending desquamation. Several instances where

families of six or seven children all remaining in the house have escaped, while one of the number was going through an attack, have come under notice. Even where, in a family of three children with but a single sleeping room, part of it only could be set apart for the treatment of a child seized with scarlet fever, the intelligent application of these principles secured the immunity of the others. So true is it that disinfection, to be real, must begin at the bodies of the sick.

The great difficulty in checking the diffusion of scarlet fever is the uncertainty as to when the infectious period of the disease is over. Six weeks must be taken as the least time allowable for the persistence of personal infection. The way in which clothes may retain infection particles is easily understood, and may be readily guarded against. The disinfecting of the house is a more difficult problem; chief dependence must always be placed upon the care taken to meet every cause of infection at its source. Afterwards, liberating fumes of sulphurous acid, by sprinkling sulphur on some live coals properly placed, is of use; a thorough cleansing of the room is necessary, also the free admission of air; even then, time must aid to free the roof from all taint.

To arrest the spread of scarlet fever at the outset presents a less difficult problem than to limit its extension afterwards. The marked character of the earliest symptoms, the suddenness of the invasion, and the shortness of the incubative period, all tend to favour the success of an immediate segregation of the sick. It is to be remarked how often those escape who are removed from contact with the sick during the first two days of the disease, and how sometimes a short contact with a convalescent has been rapidly followed by symptoms of the illness. The quarantine necessary to those who have been exposed to infection that may guard against their becoming agents in disseminating scarlet fever is not very protracted. Evidence of the shortness of the incubation period is conclusive; this, indeed, can hardly be admitted to extend, even at its longest, to five days, so that generally a week will show whether any one so exposed has taken the disease or not. A difference of result may be looked for

where there is continuous exposure to the source of infection to where there is complete removal from it; under the first circumstance four or five days of slight sore throat or precedent hoarseness have been occasionally met with. Where there has been prompt removal from the infecting cause eight days has been the longest interval from exposure to sickening, under my own observation, isolation being as complete as possible; where the removal has been less prompt, unless a complete immunity from infection may be anticipated, the probabilities are that the disease will declare itself in even a shorter time. A period of hours only has in some instances sufficed for the development of the disease, so that when so long a time as five days is given for incubation,[1] we must conclude either that there has been some hindrance to the passage of germs from the lungs to the blood, or that the first portions absorbed must have been thrown off harmless; at the same time, when a period so long as even twelve days has been given by some writers as a possible one in which the disease might appear, this interval would not be too long for observing a quarantine that might check the spread of so dread a pest.

Influenza, though rarely exanthematous, and liable to recurrence, has alliances with scarlet fever, chiefly in the rapid development of its early stages, and somewhat in its after course, whether that take the form of the herpetic catarrh of spring, the diarrhœa of summer, or the bronchitis of winter.

Hooping-cough, which, but for a doubtful turgescence of skin and the petechial spots sometimes met with, would not be exanthematous at all, has some affinities with this class of disease. It is with difficulty distinguished at the outset from influenza; both, at first, alike depress most seriously the weakest and youngest, yet the more marked consequences of the one and its much longer course render an early recogni-

[1] The evidence as to the infection of relapsing fever is the other way. Exactly five days elapsed from complete removal from the sources of infection to the appearance of the disease in an unexceptionable instance; a doubt as to the other sources of infection must attach to the cases from Camberwell workhouse, where the passing one night in infected wards was followed by the appearance of symptoms of the fever in the morning.

tion desirable. Some essential differences should not be wanting to the early stages of a disease differing so widely in its after course as this one does from influenza, in that it is almost always exempt from recurrence.

This difference is found in the pyrexial period of the early stage of the disease, being sometimes more intense, and always more prolonged in hooping-cough than in influenza, and in the incubative period of hooping-cough being much longer. Again, there is this point common to them, which occurs also in other diseases, that on the establishment of the local process the general temperature shows a tendency to decline.

Influenza seems to be immediately infectious, and twice it has occurred to me to meet with the first symptoms before elevation of temperature had set in. In one instance there was altered voice and a visibly red epiglottis; in the other, to be presently tabulated, sneezing and slight diarrhœa. In the slighter cases the pyrexial period may be a few hours only, secretion is readily established, and the temperature rapidly declines.

To take, in the first place, simple cases of influenza catarrh. An infant, a boy of three years, and a girl of one and a quarter, come from the country on April 10th to a house where the servants in charge had influenza colds. The little girl has diarrhœa on April 14th; on the 15th there is slight coryza and the first elevation of temperature; on the 16th some harshness of respiration, with a temperature of 100° axillâ; 17th, temperature normal, much defluction from nose; 18th, temperature 97·6° axillâ, and only 98·6° recto. The little boy was well on April 16th; on the 17th was hot and restless, had spots of herpes on the arm in the evening, and coughed in the night; 18th, temperature 99° axillâ, perspiring after a midday sleep; 19th, cold in the head, temperature normal. The infant, who was more restricted to the nursery, while the elder children went into other parts of the house, coughed at night on April 20th; on the 21st had signs of catarrh but was not kept to the house, the weather being hot and the catarrhal symptoms trivial.

In cold weather more serious disturbance is to be appre-

hended. On January 21st a boy, two and a half years old, is feverish at night and has croupy cough. 22nd, harsh cough; slight difficulty of swallowing; glandulæ concatenatæ palpable; pulse 160; respiration 40; temperature 101°. 23rd, loose rhonchi in larger bronchi; pulse 160; respiration 40; temperature 99·6°. Next day, pulse 100; respiration 30; temperature normal; some loose cough.

In the nursery with this child is an infant-brother three and a half months old, who, not having been out, was noticed to sneeze on January 23rd. Observations made at the very commencement are given in the following table.

TABLE 7.—*Influenza.—Pneumonia.*

CASE 1.—

Day of illness.	Date.	Pulse.	Resp.	Temperature in recto. Morning.	Evening.	Remarks.
1	Jan. 23	120	40	...	98·8°	Below the normal for this child.
2	„ 24	135	50	...	101·4°	Cough, harsh respiration, bowels relaxed.
3	„ 25	130	60	101·7°	...	Kept awake by incessant cough, high-pitched rhonchi at scapulæ.
4	„ 26	160	70	102·6°	...	Dulness at left base and diminished expansion.
5	„ 27	180	...	102·4°	103·0°	Crepitation.
6	„ 28	160	60	101·0°	102·3°	Secretion commencing.
7	„ 29	140	60	100·5°	101·0°	Large loose râles, dulness at left base.
14	Feb. 5	...	...	99·2°	...	Expansion good, lungs healthy, some consonant râles heard in large bronchi.

The next table also indicates pulmonary complication. A girl, aged four years and two months, sleeps in the same room with an elder sister, who came home from school with bronchial catarrh on December 11th, 1868. It was noticed at night how quick was the breathing of the one girl and how quiet that of the other. The next morning, at 5·30 a.m.,

a change was remarked in the younger girl; by 7 a.m. there was rapid breathing, afterwards coryza and some fever, though she was cheerful in the afternoon. Throughout the next day, December 13th, she was said to have a severe cold.

TABLE 7.—*Pneumonia.*

CASE 2.—

Day of illness.	Date.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
1	Dec. 14	140	60	101·0°	...	Congestion of left base.
2	„ 15	160	60	100·5°	...	Pallid, alæ nasi work.
„	„ „	140	70	...	100·6°	Crepitation at base.
3	„ 16	140	70	103·0°	100·1°	Rusty sputa.
4	„ 17	140	60	100·5°	...	Better.
5	„ 18	140	50	98·4°	...	Loose râles everywhere, aphthæ in mouth. Ultimate recovery perfect.

The eldest sister had a temperature of 101° in the evening of December 11th; next day, though she had some congestion of left lung, with mucous rhonchus and great acceleration both of pulse and respiration, the temperature was lower; and on the fourth day, with abundant sonorous râles, the pulse was 120, respiration 40, temperature normal. Two other children of this family on December 13th and 14th were similarly attacked.

In another nursery of four children an elder sister comes home from a day school with cough on December 8th; on December 10th the younger sister, two years old, has a similar cough; on December 13th a stout florid boy of three and a half years, who has once had croup, becomes suddenly febrile, and at night has a temperature of 101°; his breathing is rapid, both inspiration and expiration prolonged; diffused râles; cough.

Day of illness.	Date.	Pulse.	Resp.	Temperature.	Remarks.
2	Dec. 14	140	50	101·5°	
3	„ 15	120	40	99·5°	Râles, most at left base.
4	„ 16	110	40	98·0°	Loose sonorous râles everywhere.
5	„ 17	160	40	100·8°	Excitable; râles almost gone.
6	„ 18	120	35	98·0°	Râles have returned.
7	„ 19	Nearly well.		Respiration slightly harsh.	

Here were two nurseries of young children all ill together with this contagious catarrh, and in both these nurseries the nurses became affected with herpetic sore throat, coming on with intense aching of back and limbs, and resulting in the formation of several small ulcers on the tonsils in one case, and a larger, round, yellow ulcer of one tonsil in the other. In both there was a temperature of 102° on the second day, with complete defervescence on the third, though the throat, edge of palate, and back of pharynx continued to be red.

The herpetic variety of this form of catarrh is not unfrequent, and may be considered as the sporadic form of influenza; it comes on after one day of chilliness or pain, has one or at most two days of pyrexia, which subsides often most completely on the third day, requiring, however, but slight variations in the circumstances of its occurrence to be prolonged with various complications. In children it is frequently followed by ecthyma, and so great is the tendency of infectious diseases, not only to propagate their kind, but even their individual peculiarities, that several children of a family will often be seen with ecthymatous pustules on their faces or fingers, resulting from influenza colds, and appearing so nearly together as to give rise to the idea of the exudation itself having contagious properties, while, in reality, they have resulted from a common infection acting on a common predisposition. There are other complications, however, of far more importance, and, excluding the modifications of this influence mentioned at the commencement of the section, certain distinct and separable forms of it, capable themselves of acquiring epidemic influence; yet neuralgia, rheumatism, quinsy, gastric catarrh, diarrhœa, dysentery, bronchitis, and pneumonia frequently result so directly, and the number of unplaced phenomena bearing upon the subject is so great, as to make one conclude that there is no such thing as idiopathic inflammation at all, and that the history of "common cold" has yet to be written.

In the following instances of high temperature associated with influenza the influence of a diathesis is obvious.

Case 1.—A boy, æt. 5 years and 4 months, has suffered, together with three older and two younger children in the family, from influenza colds, with herpetic and impetiginous spots chiefly on the face; this child has ecthyma of one finger extending to the nail, the remains of some eruption at the right angle of the mouth, and a sore at the edge of the right nostril, obstructing it. He has suffered much from illness; he had croup as an infant, subsequently some meningeal affection, and is slightly hydrocephalic; most of the teeth are decayed, but he is lively and well grown; frequently stumbles in his walk. During the past week's illness he has passed water involuntarily at night, and has been nervous and frightened in the day; he has complained of pain in the head, and has frequently squinted. February 21st, was sick in the night, and had no relief from the bowels. At 2 p.m. the pulse was 140; respiration 44 in the minute; temperature in the axilla 103°; pain complained of behind both ears; no otitis; glands of the neck are perceptibly enlarged. At 4 p.m. he was relieved by black vomit, and afterwards by similar matter from the bowels; a small dose of calomel was given; he afterwards slept well. Next day, February 22nd, the temperature in the axilla was 100°, and the day after 99°; there were streaks of mucus at the back of the pharynx; the head symptoms, at first pronounced to be secondary, had entirely disappeared. The bowels showed a tendency to constipation till the 26th, when there was restlessness at night and involuntary micturition. On the 27th the action of the bowels was normal, but the urine contained uric acid, which largely deposited on the 28th. March 2nd.—Pulse 100; respiration 26; temperature, axilla, 98·8°. Nostril healed; angle of mouth sore; back of pharynx red, streaks of mucus on it; appetite better; a dessert-spoonful of wine at dinner makes him excitable and prevents him walking steadily; to discontinue it, and take syrup of iodide of iron.

The nurse had ulcerated sore throat on February 22nd, and herpes of lip on 24th; in the next case a servant has herpes of the lip, and the illness of the child follows.

CASE 2.—A boy, æt. 7, subject to sudden febrile attacks accompanying acute enlargement of tonsils; has had a pustular spot on one cheek for a few days. A servant in the house had herpetic catarrh a week before.

Day of illness.	Date.	Pulse.	Resp.	Temp.	Remarks.
	Mar. 22	Woke early in the night with a croupy cry, hot and restless afterwards.			
1	„ 23	Both tonsils large, smooth, left slightly red, glands on left side of neck palpable, temp. axilla 103·0°; tincture of steel given.			
2	„ 24	120	30	101·0°	Throat red, no specks on tonsils, viscid defluxion from nostrils.
3	„ 25	112	28	99·4°	Tongue clean, tonsils paler, still full, a small pustule on neck.
4	„ 26	100	20	98·8°	Acrid discharge from nose, sleeps well.

The following case is as much like quinsy as possible in a child so young.

CASE 3.—A girl, æt. 4½, complained of fatigue and loss of appetite on April 26th. Wine given at night; great fever and restlessness afterwards.

Day of illness.	Date.	Pulse.	Resp.	Temp.	Remarks.
1	April 27	...	...	Burning heat.	Vomited; an aperient caused one very dark evacuation.
2	„ 28	144	48	103·0°	Face and arms red, tonsils full with white specks.
3	„ 29	120	30	102·2°	Tonsils enormously distended, glands of neck hardly perceptible.
4	„ 30	110	25	99·1°	Appetite returning, fulness of tonsils has subsided, but they meet, the specks have red edges; uric acid in urine.
5	May 1	Improving; rapid subsidence of tonsils.			

As an illustration of bronchial catarrh in which the temperature falls as secretion is established may be mentioned

the case of a boy, æt. 5, attending a day school, who has slight signs of cold on May 19th, with relaxation of the bowels. On the 20th he is flushed and excitable in the evening, very hot in the night, and disturbed with noisy breathing; pulse 140; respiration 32; temperature 102·8 in the axilla. Next day the respiratory sounds are weak, the fever rather less; salines and rest in bed are prescribed. On the 22nd there are increased signs of bronchial irritation and less fever. On the 24th free bronchial secretion; temperature 97·4 in the axilla.

Case 4.—*Gastric catarrh; sudden fall of three degrees in temperature after purgation.*—A boy, æt. 3, of rapid growth, thirty-eight and a half inches high (he was thirty-six inches in June last, and thirty-seven and a half in October, so has not grown so rapidly of late) has a slight cold on February 19th; next day, weather being very cold, he is out long and late, and complains of pain in stomach and limbs.

Day of illness.	Date.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
1	Feb. 20	...	...	...	...	Cough at night and diarrhœa.
2	„ 21	130	30	...	102·0°	Headache, rigors, talks in sleep.
3	„ 22	120	30	101·0°	101·4°	Pain in stomach, no cough.
4	„ 23	140	40	102·5°		Tongue furred, yawns, mouth twitches; calomel ½ grain given.
5	„ 24	110	30	99·4°		Bowels three times acted on last night.
7	„ 26	100	26	Non-febrile.		One natural action of bowels.
14	March 5	A sister has cold and sore throat; also a servant, who also has herpetic spots.				

The weather became suddenly mild on February 20th, with a half-inch fall of the barometer, when the following case of bronchial catarrh was observed.

Case 5.—A boy, æt. 2, still at the breast, the canine teeth not cut, has heat of head on the 21st, cough on the 22nd, coryza on the 23rd, first seen by me on the 24th.

Day of illness.	Date.	Pulse.	Resp.	Temperature.	Remarks.
4	Feb. 24	120	40	100·0° recto.	Sonorous rhonchi at back of chest, sordes on gums, had been purged by calomel.
5	„ 25	120	46	100·6° „	Gums lanced, great irritability, no coryza.
6	„ 26	120	40	100·4° „	Loose cough.
8	„ 28	120	30	100·0° „	Bronchial râles, coryza.
9	March 1	130	40	101·2° „	Harsh respiration with moist râles, excitable at night.

Improvement followed upon an improved diet.

Lancing the gums in this case had no influence on the temperature changes, and the calomel purge at the commencement was injurious. In the following case, occurring in hot weather, the febrile disturbance was neither made shorter nor less by the early use of calomel; moreover, though one of the last two molar teeth was not quite above the gum and the other quite under, they were not interfered with, and the temperature crisis, as in the first of these cases, was determined by a copious deposit of uric acid.

Case 6.—A girl, æt. $2\frac{1}{2}$, well grown, and in apparent health, travels by railway to the seaside on August 14th, the weather being hot, with a cold wind. The bowels are twice disturbed on the evening of arrival. The next day she is out much in the wind, and becomes feverish at night, and is of a burning heat in the morning, when a dose of calomel is given; both vomiting and purging were induced, the fever at night was no less, and next day, August 17th, two doses of calomel were given, and a warm bath at night.

Day of illness.	Date.	Pulse.	Resp.	Temperature in axilla. Morning.	Evening.	Remarks.
3	Aug. 17	...	...	...	103·0°	Frequent disturbance of bowels.
4	„ 18	140	40	102·3°	102·3°	Mucous purging, dry tongue, husky cough.
5	„ 19	130	40	02·0°	102·5°	Urine scanty, bowels free, skin moist.

Day of illness.	Date.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
6	Aug. 20	116	25	97·2°		Slept well, urine very free, with large deposit of uric-acid crystals.
8	„ 22	No return of fever, action of bowels slight and of light colour, almost white on the 24th, natural by the 26th.				

A round worm was voided by this child early in the November following.

Salivation from Steadman's teething powders.

A girl, æt. 2, has a cold, and is thought to be ill from teething, the last four molars not being through. The above powders, calomel and opium, are given frequently.

Date.	Temperature.	Remarks.
April 3	102°	Gums swelled nearly to the level of the teeth.
„ 4	101°	Mouth less sore, gums and cervical glands swelled.
„ 7	99°	Mouth well, health improving.

Last molars are not nearly so forward as might have been expected from the ease of early dentition with this child; unfortunately these powders were commenced during some disturbance with the appearance of the canine teeth some months since; by frequent repetition they had caused the usual arrest of development until the elimination of the poison was at length attempted.

Continuous elevation of temperature accompanying an eruption on the face and body.

A boy, æt. 3½, strong and healthy, but subject to sudden febrile attacks. After a cold has an eruption extending from the upper lip to the right cheek, which is swollen. When the child was first seen, on April 8th, these spots had become pustular, but numerous raised spots, minutely vesicular (the spots on the cheek said to be like these at first), appear on the chest, abdomen, inner part of arms, outer part of thighs, and on the hips; the temperature of the mouth inside the right cheek is 100·3°. On April 11th it is 100·5°; pustules have appeared on the eyebrows, the spots on the hips are pustular, on one finger the cuticle is raised by a pustular

secretion. April 13th.—Some spots are drying, others extending; temperature in the mouth 101·8°; in the axilla 101·5°; a new but less purulent bulla on finger, the first is well. The child does not appear to be ill; some of the places are irritable at night; those on the body extend in a somewhat circinate manner. April 16th.—All the places are better; purulent crusts are formed on the head; dry, raised crusts on some parts of the body; the face and lips clear; temperature in the mouth 99°, in the axilla 99·5°. April 25th.—Face quite clear; temperature in the mouth 97° only could be obtained; in the axilla still 99°·5. There are one or two recent spots on the shoulder, rounded, smaller, drying in the centre; on the dorsum of the foot is a circinate crop of similar spots. Child nearly well. Very little treatment beyond the bath was used; occasionally a mild aperient was required. The year before, on February 25th, the other children in the family having contagious colds, and this child having slight symptoms on the 23rd, has one of the short febrile attacks not unfrequent with him. He slept all day, ate nothing; temperature, axilla, at 5 p.m. 102·5°. He roused up before night, ate, and slept well; had no medicine, and next day, at 5 p.m., the temperature was 99·4°; small glands perceptible in neck. March 1st.—Pulse 112; respiration 28; temperature 99·4°; tone of voice indicative of cold. Some months previously the pulse was 100, the respiration 22 only, when in health.

Herpes zoster, or Shingles, belongs to this class of disease, and is liable to recurrence; it may directly follow upon a chill, or occur in the course of influenza. The pyrexia begins only with the first spots of eruption, and is greatest on the third day, when they are vesiculated. The general temperature subsides before the vesicles begin to dry, and then the local temperature, often previously at 101°, is not above the normal, though the skin be red and hot to the touch; so that, when at the worst, very little temperature-disturbance remains. The pulse is accelerated throughout, while the rate of the respiration is not affected.

Hooping-cough gives rise to a remarkable series of temperature-variations. The whole of what in my first paper (Vol. X) is called the incubation period is pyrexial, often to a high degree, and is therefore always an important and sometimes a serious part of the disease. This generally occupies the first week of the illness, and as the characteristic hoop is then very uncertain in its appearance, a longer time often elapses before the presence of the disease is recognised. Hooping-cough, like scarlet fever, may be either immediately infectious, or not appear till after an interval of more or less freedom from ailment, with this difference, that while in scarlet fever, if there is no appearance of rash by the eighth day after exposure to infection, there is a fair presumption of immunity, in hooping-cough seven days is probably the shortest limit of the period in which to expect the more obvious evidences of the disease to be developed.[1] During this period of invasion there is a marked and often progressive elevation of temperature, in itself sufficient to differentiate hooping-cough from the slighter forms of influenza, and sometimes, as in the following case, so out of proportion to the local lesion present as to necessitate the inference of a zymotic cause.

TABLE 8.—*Hooping-cough.*

CASE 1.—A delicate girl, æt. 1, whose sisters are at school, and have a cough suspiciously like hooping-cough, wakes up febrile after a few hours' sleep, at 8 p.m., April 4th, 1869.

Next morning she seemed well, but was again hot in the evening; after a sleep on the 6th there was constipation; on the 7th, thirst, and no appetite.

[1] In one case a boy exposed both to measles and hooping-cough at a day school is first taken ill with measles, and afterwards the symptoms of hooping-cough appear; this might either be evidence of the longer incubation period of hooping-cough, or only of the less intensity of its invasion stage, and of the prepotency of measles. All the other children in the family had measles first and hooping-cough after, this being the order in which they were exposed to infection.

Date.	Pulse.	Resp.	Temperature.	Remarks.
April 7	200	80	105·3° recto.	Dyspnœa.
„ 8	140	50	101·0° „	Congestion of right base.
„ 9	180	60	103·6° „	Crepitation.
„ 10	140	70	98·5° „	Loose râles.

On the 14th hooping-cough well marked, as also in four others of the family who had been ailing most of this time. On April 28th this child again has disturbed breathing, and deficient expansion of right base; on 29th dyspnœa; defective respiration below scapula; râles everywhere; crepitation at base of lungs; convulsions; pupils somewhat dilated, but act to light; fontanelle depressed; pulse 150; respiration 60; temperature 102·5°. On the 30th convulsions through the night; pupils inactive; temperature 103·2°; alæ nasi compressed in inspiration; death at 6 p.m. A remarkable fall of temperature accompanied the establishment of the local process in the lung on the seventh day; that the high temperature preceding this was not due to the lung complication, but part of the general disease, and analogous to what takes place in the early stages of all the exanthemata, is not only the most likely supposition from the facts of the case itself, but is made evident from the case in accompanying table.

Case 2.—A boy, æt. 4½, exposed to hooping-cough for ten days or a fortnight, is found, after slight symptoms of illness, to be febrile on March 18th.

Day of illness.	Date.	Pulse.	Resp.	Temp.	Remarks.
2	March 18	100	...	99·4° axilla.	Pulse full and jerking; to remain in doors.
3	„ 19	...	...	99·6° „	Coughed in the night.
4	„ 20	120	28	100·4° „	Seems dull and heavy; some loose cough, and wheezing heard.
5	„ 21	120	24	99·8° „	Face flushed; loose râles in larger bronchial tubes.

Day of illness.	Date.	Pulse.	Resp.	Temp.	Remarks.
7	March 23	108	22	99·2° axilla.	Sick before dinner, no appetite, the wheezing has gone, earache at night.
8	„ 24	130	...	102·0° „	Generally worse, not much cough; lips full, dry and red, face flushed; high fever in the night.
9	„ 25	140	40	103·4° „	Tongue white; worse at night delirious.
10	„ 26	140	40	103·0° „	No râles nor defective respiration, perspired a little in the night; bowels and urine free, no chest complication.
11	„ 27	140	40	103·8° noon.	Three grains of quinine given in the afternoon reduced the temperature to 101·3°, and after a second dose it was 100·8°.
„	By 8 p.m.	110	30	101·3° recto.	Only 100·8° in axilla, a fall of three degrees in eight hours from 1½ grs. of quinine, or a fall of four and a half degrees of temperature in one day.
„	At night	100	30	100·8° axilla.	
12	„ 28	100	26	99·3° „	Moist rhonchi on deep inspiration.
13	„ 29	108	30	99·6° „	Respiration weak and irregular in rhythm, frequent cough, deafness, rhonchi on expiration.
14	„ 30	100	26	99·1° „	Earache.
16	April 1	100	26	99·4° „	Inspiration prolonged; no rhonchi.
19	„ 4	100	30	98·6° „	Coughs but little, is weak and thin.
21	„ 6	100	26	99·2° „	Constipation; takes cod liver oil.
24	„ 9	100	20	99·5° „	Regaining flesh, is easily tired.
34	„ 19	88	22	99·0° at end of six weeks.	Better; to go out.

The high temperature from the eighth, ninth, and tenth

days of the illness was not owing to any chest complication nor to otitis; the ears were examined, and there was no deafness on either of those days. On the morning of the eleventh day the child was removed from the room, where the infant was suffering some of the worst effects of the disease, and two drachms of brandy given with no good effect. The quinine was not given until 2 p.m. An hour afterwards the pulse was much quieter, and reduced twenty beats in the minute. The child seemed roused from the lethargy of the previous two days, and wished to be read to; it was then noticed that some degree of deafness existed, and the voice had to be raised in reading to him. Two hours after he felt hungry, eat, and the sordes cleared from the lips. After the second dose of quinine he seemed more deaf, and fell asleep, the pulse then being only 100 in the minute, and the temperature had fallen three degrees, the greatest care being taken that this was obtained with absolute accuracy. The bowels were relieved naturally next morning, and the cough resumed its ordinary characters; the deafness had not quite disappeared before the second attack of earache.

This boy was not seen till March 18th, when he was dressed for going out, and was said to be quite well; but the quick, jerking pulse and elevated temperature showed the necessity for immediate rest and precaution. It is probable that his illness commenced at the same time as that of his two elder sisters, whose cases follow, and that the greater severity and continuance of the early stage of it, is chiefly owing to his greater exposure to the source of infection. The high degree of temperature maintained at the commencement of the second stage of accession is evidently controlled by quinine.

The other children in this family were three girls, the youngest, a year and a half old, has a cough in February, attributed to teething. She was said not to be febrile, and was taken out daily till the beginning of March, when, the weather being cold, she was kept at home, and was consequently more with the other children. The boy was the only one who slept on the nursery floor, and he was in the same room. On March 8th the infant's cough, besides

being spasmodic, was attended with some thin phlegm, which had not accompanied the former cough. On the 15th the child was seen with all the characteristics of hooping-cough.

On examining the sisters, the elder (Case 3), seven years old, apparently quite well, had a temperature below the normal; she sneezed at night, next day was fretful; pulse 100; respiration 26; temperature 98·6° axilla. March 18th.—Seems heavy, easily tires and cries, tongue pale, glandulæ concatenatæ a little enlarged; slight irritable cough, quick pulse; temperature 100·4° in the axilla. Next day more cough, glands of neck considerably enlarged; still febrile. 21st.—Cervical glands less in size, pulse quiek; she is still febrile, but emotional, so that the temperature is not exactly ascertained. March 23rd.—Lively, good appetite, loose cough, glands of neck have subsided, temperature normal. The cough was not severe; it caused the face to redden, and continued for three weeks.

The younger sister (Case 4), three years and four months of age, had the first depression of temperature on March 16th, when she looked pallid, but did not feel ill. Next day the appetite was bad, the respiration shallow. The illness had commenced, and furnished the following observations:

Day of illness.	Date.	Pulse.	Resp.	Temperature. Noon.	Temperature. Evening.	Remarks.
3	March 18	120	28	...	100·6°	Tongue white, no cough, small glands in neck.
4	„ 19	104	...	...	99·4°	Pallid, eyes heavy, short breath.
5	„ 20	120	26	101·0°[1]		Râles developed on deep inspiration.
6	„ 21	130	26	100·4°		Sonorous rhonchus; tongue white; lips dry, swelled.
7	„ 22	110	28	99·2°		Loose sonorous rhonchus; seems ill, dull and heavy.
8	„ 23	112	...	...	98·0°	Pallid; coryza, eyelids swollen, better.
9	„ 24	108	28	...	...	Seems weak and languid, had earache in the night, and spasmodic cough; relieved by morphia.

[1] Evidently not influenza; or the temperature would have fallen, or some more marked local effect have appeared ere this.

Day of illness.	Date.	Pulse.	Resp.	Temperature. Noon.	Temperature. Evening.	Remarks.
10	March 25	120	30	...	99·0°	Whoops with the cough, and wheezes.
11	„ 26	110	26	98·6°		Tongue clean, good appetite, cheerful.
13	„ 28	120	20	98·4°		Loose râles; better.
15	„ 30	104	26	98·5°		Râles developed on deep inspiration.
21	April 6	100	22	98·6°		Seems nearly well, coughs night and morning.
24	„ 9	...	...	99·2°		Is not disturbed at night; has a slight fit of coughing, with loose phlegm, in the morning; is taking cod liver oil, which, perhaps, increases the temperature.
45	„ 30	...	...	99·4°		Eyes redden on coughing; white mucus at back of pharynx.

The infant, Case 5, after nearly a fortnight's illness and a week's cough, whooped with it on March 13th. On the 18th the paroxysms were of great violence, and there was much secretion. An emetic with antimony in the night afforded some relief, but was followed by an increase of illness. Next day the face became almost black in the spasms of cough; in the interval air entered the lungs freely everywhere. The temperature at this time was 99·8°; on the 21st, 99·6°; 24th, 99°, with loose râles. On the 26th morphia in minute doses had diminished the expectoration, but was discontinued because of some crepitant râles at the left base, and a poultice was applied; at the same time the temperature was only 99·2°. On the 27th the temperature was 98·2°; the pulse was 120 in the minute; the respiration 36, and much freer. A combination of atropine and morphia, one sixtieth of a grain of each in sugar powders, was now used with most marked good effect, not only in moderating the spasm, but, at the same time in lessening the amount of the thin, acrid secretion. On visiting the child at night the pulse was 88, the respiration 30, the temperature *in recto* 98·7°, and on the surface not

above the normal. On April 7th the cough and secretion were both increased by going out of doors; the temperature was 99·2°. On May 4th the cough was not lost, though there was but little expectoration; the temperature *in recto* was 99·4°. The eye teeth were near the gum, though not giving rise to much discomfort, and the child's health had much improved.

The treatment in these cases, unless otherwise stated, consisted of ammonia, lemon-juice, and the simplest salines.

The first febrile disturbance occasioned by hooping-cough has a tendency to subsidence on the eighth day, but is most variable, both in kind and degree. Sometimes, but not always, there is evident pulmonary implication, and then the kind of cough and illness that is to result is not altogether unexpected; at others there is little to forewarn and that little is often disregarded, the more so as nearly a fortnight will elapse before the paroxysmal cough is unmistakable.

Where there has been but one exposure to a source of infection an immunity is often hoped for and expected just before the symptoms are developed in full violence, and not unfrequently the disease is at this time unintentionally spread. Examples of the more insidious forms will be first adduced; other cases illustrate the temperature changes of the early stages; the last case but one shows the persistence of a high temperature in the latter stages of this disease; and finally, one case is given of fatal pulmonary complication at its close.

Case 6.[1]—A boy, æt. 6 years, seems amiss on November the 15th and 16th, but not so much as to prevent him going to school every day. On the 19th he has a cough, and on the 20th a fine rash on the face and chest; he stayed at home without medical aid till the 24th, when he had loss of appetite and hardly any signs of rash. On the 26th the cough became spas-

[1] The house in which these three children resided was made unwholesome by old brick drains in the basement.

modic and the fine rash on the face became more obvious, with spots smaller and brighter than the mottling from measles. A brother, of nearly four years, has already loss of appetite; a pulse of 100, respiration 30 in the minute, and temperature 100° in the axilla. On the 26th wheezing, with temperature still above the normal.

There was then but little to be complained of; the wheezing was only developed on forced inspiration. On the 28th the temperature was 98·6° in the axilla, and there was already some cough, not evidently hooping-cough, for another week or more, and then not very bad till in the severe weather of the early part of the new year.

Case 7.—A sister, æt. 2½ years, on the same day, November 24th, was dull, sleepy, and slightly febrile; she had slight diarrhœa on the 20th, and had not seemed quite well since. On November 25th the pulse was 120, the respiration 40, temperature 100·5° in the axilla; there was thin white mucus in the throat and the glands of the neck were perceptibly enlarged. On the 26th there were loose rhonchi audible over the whole chest, the temperature half a degree less, other conditions the same. On the 27th the evening temperature was 99·6°; on the 28th it was normal, the child was fretful, but the cough quiet. These children were at no time so ill as the youngest.

Case 8.—A boy, æt. 7½ months, nourished chiefly from the breast, apparently strong and robust, was seen November 22nd, because of supposed tooth irritation; the central incisors were not very forward, and the temperature, even in the rectum, was below the normal; next day he was said to cough and have short breathing, and the day after he refused food and would only suck a little at a time, but did not seem feverish till night, when very restless and burning hot.

Day of illness.	Date.	Pulse.	Resp.	Temp.	Remarks.
2	Nov. 25	200	80	102·6°	Air enters all parts of lungs; there are ten quick respirations every five seconds, and then a pause.
3	„ 26	200	70	104·0°	Alæ nasi work; dyspnœa relieved by night.
4	„ 27	180	80	102·2°	Respiration improved, moist râles are developed on deep inspiration.
5	„ 28	...	...	101·0°	Vomits with cough.
6	„ 29	130	50	101·5°	Coughs every hour in the night, high pitched rhonchi at right base.
8	Dec. 1	...	...	90·8°	Cough looser, fine petechiæ on skin.
9	„ 2	120	40	99·6°	Improving.

In the cold weather of the early part of this year the spasm with the cough became more violent. The child was kept more at the breast, while, at the same time, the mother had become disqualified (by menstruating on January 15th) for nursing. On February 10th a short febrile exacerbation gave a warning, which was not heeded. On March 12th there was a repetition of febrile disturbance. The child had become thin and weak, and on the 21st he was sick, constipated, feverish, with cough and wheezing, and the following illness:

Date.	Pulse.	Resp.	Temp.	Remarks.
March 22	160	40	103·0°	Large rhonchi, no defective breath sound.
„ 23	140	40	101·0°	Vomits; wakeful, excitable.
„ 24	120	40	99·4°	Crepitation over a definite spot at base of right lung.
„ 27	120	35	98·6°	Below the normal in the axilla, though there is a spot at the right scapula where there are tubular, high-pitched rhonchi and deficient breath sounds; after being suckled much at night he vomited and became feverish, and the next day he was ordered to be weaned.
March 29	140	50	101·5°	Congestion of left as well as of right base.
„ 30	140	56	101·2°	Crepitation at right scapula only, left lung healthy.
„ 31	...	...	99·0°	Perspiration; has not been to the breast again
April 1	Not febrile.			Small petechiæ visible on neck and chest.
„ 10	...	...	99·0°	Improving, respiration clear.

The incisor teeth were cut without difficulty in the earlier part of the illness. There had been but little signs of hooping-cough in this last illness, during which on two occasions, probably from a defective state of the mother's milk, a sharply febrile attack has terminated in congestive deposit, and even inflammation of a limited part of the lung coincident with a subsidence of temperature almost to the normal; besides the theoretical analogy of this to what occurs when free secretion results, the practical import of it is that a comparatively low temperature does not exclude mischief, for on neither of these days, March 24th and 31st, would the temperature have sufficed to indicate the state of the lung.

Case 9.—A boy, æt. 9, going to school as a weekly boarder, comes under notice February 23rd with hæmorrhage from the bowels. He has been at home three days with a cough, and he was noticed to cough suspiciously the week before. Two little sisters, æt. 3½ and 2, when first seen on February 25th, had coughs which excited a suspicion of hooping-cough, the more so as they had come on without the signs of ordinary cold. On the 28th the youngest had whooped, the cough was violently paroxysmal; some large, loose rhonchi were audible over the chest, chiefly consonant with the larger bronchial tubes; a slight elevation of temperature, hitherto noticeable, had subsided. Both children had the cough badly for the next week or two; some violent paroxysms in the younger child were cut short by minute doses of antimony.

Case 10.—A brother, æt. 6, much with the elder boy since the 19th, did not seem to be quite well on the 25th, but was without cough; the first permanent molars were near the gum, and his temperature was below the normal. A slight cough was first observed on the 27th, when the axillary temperature was 98·6° at noon, and 99° at night. On February 28th the temperature was 99·4°, pulse 100, respiration 24, the tongue whitish, no appetite; there was glairy mucus at the back of the pharynx. This slight degree of pyrexia con-

tinued until March 5th, when the temperature at night was only 99° in the axilla; the slight acceleration of pulse and the somewhat spasmodic cough causing the face and eyes to redden, but resulting in very little expectoration, being the only signs of illness. There was still glairy mucus in the throat, the tongue was cleaner, and the appetite had returned since March 2nd. On March the 8th the cough had become more characteristic, the breathing was slow and shallow, but a deep inspiration developes some moist râles in the smaller tubes; the pulse continued to be quick, but the temperature had become normal; it was 98·3° in the axilla. During the month an elevation of temperature was, however, frequently met with. On the 30th it was 99·6° at 4 p.m.; the cough dry, and causing flushed face; he had sometimes trouble from tenesmus, and was noticed to be readily fatigued.

The next case presents features of unusual gravity.

Case 11.—A girl, æt. 5, whose brother is attending a day-school, and has had cough for some time, is seen on March 23rd with catarrhal symptoms said to be of a week's duration; and, though suspected to be from hooping-cough, the general illness during the next four days was sufficiently severe to arouse doubts both as to cerebral disease and fever.

Date.	Pulse.	Resp.	Temperature. Noon.	Night.	Remarks.
March 23	...	...	99·0° axilla	...	Coryza, cough, with sickness.
„ 27	100	26	...	99·8° recto.	Lips dry and swollen, frequent vomiting.
„ 31	120	40	99·5° axilla	...	Somnolence, great prostration.
April 2	108	30	99·0° „	...	Earache, violent cough, dusky face, swollen lips.
„ 4	100	30	99·8°		Bloody mucus, both with expectoration and vomiting.
„ 6	100	34	100·5°		Small doses of morphia gave no relief to cough and are not to be repeated; large rhonchi at right back, râles everywhere.
„ 7	180	36	102·5° recto		Large liquid rhonchi, some of high pitch; sputa viscid and opaque; conium and ammonia given.

Date.	Pulse.	Resp.	Temperature. Noon.	Night.	Remarks.
April 9	120	40	102·0° axilla		Less expectoration, cough violent; takes atropine and morphia.
„ 10	...	...	102·4° „		Thick expectoration mixed with blood, blood in the stools and vomit, respiration freer; to take chloral at night.
„ 11	130	40	103·0° recto		Takes but little nourishment, and retains less.
„ 12	120	40	102·5° axilla		Had sleep after third ten-grain dose of hydrate of chloral.
„ 13	quick, feeble	...	101·4° „		Less sick; chloral to be given at night.
„ 14	...	...	101·7° „		Slept, cough and expectoration; better.
„ 15	130	42	...	103·3° recto.	Bowels relaxed, cough; more points of blood in the mucus; chloride of aluminum administered in the form of spray.
„ 16	120	36	...	101·6° axilla.	Less blood in the expectoration and vomit; to be carried out of doors.
„ 17	110	30	...	99·0° „	Ate meat; no blood in the stools.
„ 18	Much improved. Temperature 98·9 axilla at 6 p.m. Some large mucous rhonchus heard in coughing.				
„ 19	Doing well; coughed frequently in the night; small streaks of blood only in the pharyngeal mucus at the end of coughing.				
„ 20	5 p. m.; temperature 99·4°; loose cough, troublesome only at night; no blood in the expectoration; complexion healthy; takes cod-liver oil.				
May 10	Quite well; no cough except, perhaps, once towards morning.				

The following fatal result of hooping-cough closes these observations:

Case 12.—A girl, æt. 1¼, having suffered from hooping-cough for six weeks or more, is seen on April 18th suffering from extreme dyspnœa, with signs of pneumonia of the left lung. The pulse and respiration were too much disturbed to be accurately recorded.

Date.	Temperature. Morning.	Night.		Remarks.
April 18	...	104·0°	recto	Face livid, ensiform cartilage retracted in inspiration, fine dry crepitation over left lung.
„ 19	99·6°	101·2°	„	Administration of brandy of some benefit.
„ 20	101·0°	100·8°	„	Loose râles, moist crepitation, much mucus expectorated.
„ 21	101·2°	102·0°	„	Return of dry crepitation and of dyspnœa, dulness of left back, lips livid.
„ 22	Death at 8 a.m.			

The only temperature-observations in hooping-cough that have come under my notice, beyond the instance given in my last paper (Vol. X, p. 296, where 104° was reached with convulsions and recovery) are those of Dr. Henri Roger;[1] they are sixteen in number, taken in three cases, and fairly indicate what is found in these more extended investigations. Associated with slight bronchitis a temperature of 100·5° is recorded, with very intense bronchitis 102°; without complication the lower range is about 99°; the highest temperature met with was 103·5° in a case where abscess of the lung and cerebral ramollissement co-existed.

In the ordinary course of hooping-cough the temperature variations resemble for a time those tabulated in the case of influenza, corresponding closely with what is observed both in influenza and in croup; but these two diseases, *identical in themselves*, differ essentially from hooping-cough in being suddenly febrile, while the pyrexia preceding the latter is always of some days' duration, and is most marked in some of the most insidious cases. This also is noticeable of diphtheria, and forms a chief means of establishing the essential difference between it and scarlet fever. The early stage, both of hooping-cough and diphtheria, though obscure and often overlooked, is probably the only part constant and inevitable; at this time treatment may be powerless to avert disease, though most powerful in guiding it to a favorable termination; in neither disease is the virulence of the infectious pro-

[1] "De la Température dans les Maladies de l'Enfance." 'Arch. Gén. de Méd.,' p. 301, t. vi, ser. 4, 1844.

ducts so great at first as it becomes in the later stages; even then, the amount of infection is very much as the amount of morbid secretion formed; and as whatever limits these secretions also limits the amount of disease present, an opportunity is afforded for medical treatment to check the effects, if not to shorten the duration, of the disease.

Tuberculosis checked by quinine.

A boy, æt. 12, height fifty-one inches, after a cold in the spring, has loss of flesh and some chest affection with deficient expansion of the left apex on April 28th, when the pulse is 120, respiration 30, and the temperature 98·4° in the axilla. On May 2nd, though there is perspiration, shortness of breath, pallor, and loss of appetite, the pulse is 80, respiration 28, and the temperature in the axilla only 98·2° at night Country air and cod-liver oil did some good. In August the pulse and breathing were again quick, and the axillary temperature was 99·1° at noon. Change of air now did no good, and in November the day temperature was generally 99°, and the night temperature 101·5° to 102°. The rise of temperature would begin at an early hour in the afternoon, whatever the care as to quietude and diet; nor was the evening hectic checked by rest, by stimulants, or any of the means directed against the evident deposit, and its commencing alterations in the left apex of the lung. On December 6th and on 7th five grains given in solution rapidly arrested the night fever; by the time the daily dose of quinine had reached ten grains, the evening exacerbation was entirely prevented, and from that time the boy gained in flesh and strength; a year afterwards he continued in good, though not robust, health.

Meningitis,—though not without elevation of temperature through most of its course, and subject to a sudden and great increase before its fatal termination, yet in the last case given in the table the temperature was found to be below the normal on the day before death, which seemed to result from great effusion of serum and consequent pressure.

TABLE 9.—*Tubercular Meningitis.*

CASE 1.—A boy, æt. 4 months, after slight dreariness and constipation, on April 10th has a convulsive seizure in the night

Day of illness.	Date.	Temperature. Morning.	Evening.	Remarks.
2	April 11	100·0° recto	101·0°	Convulsive twitchings all day.
3	„ 12	104·0° „	103·6° axilla.	Pupils not contracted, temperature not reduced by cold affusion.
4	„ 13	Death.		

Acute hydrocephalus; remarkable fall of temperature before death.

CASE 2.—A girl, æt. 1¾ year, after four days' vomiting is partially unconscious on the fifth day, and delirious at night.

Day of illness.	Date.	Pulse.	Resp.	Temperature.		Remarks.
6	Dec. 30	80	20	100·2° recto	98·6° axilla.	Dilated pupil.
7	„ 31	irregular		100·1° „	98·4° „	Coma.
8	Jan. 1	120	30	100·4° „	...	Surface cold.
9	„ 2	weak, irregular		98·2° „	97·0°	in folds of abdomen.
„	At night	...		100·0° „	...	Limbs cold.
10	„ 3	Death. Some heat of surface before death.				

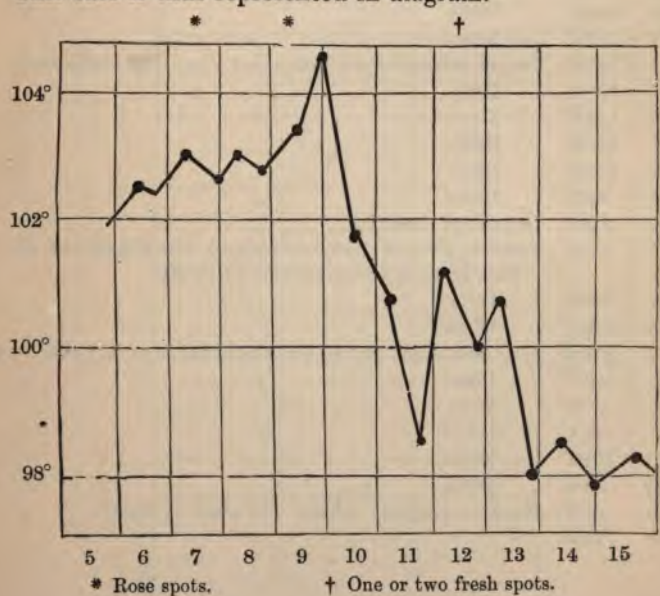
I remember much anxiety and doubt as to whether some early head symptoms in a child might be owing to tubercular meningitis or to typhoid fever, a question which at certain stages can readily be decided by temperature. This is well illustrated by a case of typhoid fever in an infant of sixteen months old, for which I am indebted to Dr. Hare.

TABLE 10.—*Typhoid Fever.*

CASE 1.—An infant, æt. 16 months, has diarrhœa, and high temperature with evening exacerbation for a week.

Day of illness.	Date.	Temperature in axilla. Morning.	Evening.	Remarks.
7	March 14	...	103·0°	Rose spots.
	„ 16	...	103·4°	Ditto.
10	„ 17	104·8°	101·8°	
11	„ 18	100·8°	98·4°	One or two fresh spots.
12	„ 19	101·0°	100·0°	
13	„ 20	100·8°	98·0°	
14	„ 21	98·4°	97·8°	

This case is thus represented in diagram.



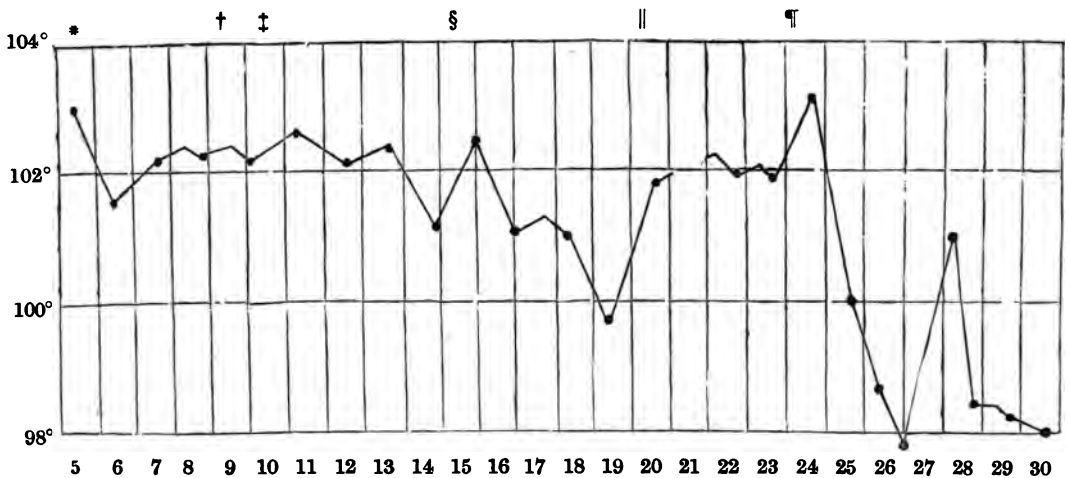
For the details of the following case I am indebted to my friend and former pupil, Dr. Buckell, of Islington. Diagrams of it, and of another case in an older girl under my care, in which there was no diarrhœa, are given for comparison with the somewhat anomalous case in the last diagram.

Case 2.—A girl, æt. 8, was seen after about a week of malaise and anorexia. Complained of pain in abdomen; on pressure gurgling was elicited in left iliac fossa; tongue was pyrexial in character.

Day of illness.	Temp. Noon.	Remarks
7	103·0°	Four grains of cinchonæ sulph. given in twenty-four hours.
8	101·8°	Ditto.
9	102·2°	Ditto. Diarrhœa very severe.
10	102·4°	Ditto. Rose spots appeared.
11	102·4°	Ditto.
12	102·8°	Ditto.
13	102·2°	Ditto.
14	102·6°	Tongue became brown; stimulant given with cinchona.
15	101·2°	Ditto.
16	102·6°	Ditto.
17	101·2°	Ditto.
18	101·2°	Ditto.
19	99·9°	Ditto.
20	102·0°	Increase of anorexia.
21	101·2°	Vomiting came on; cinchona stopped, nourishment and stimulants given by bowel, nothing by mouth.
22	102·1°	Ditto.
23	102·0°	Ditto.
24	103·4°	Cinchonæ sulph. gr. viij given by bowel in twenty-four hours.
25	100·1°	Ditto.
26	98·8°	Ditto.
27	97·4°	Ditto.
28	101·2°	Ditto.
29	98·4°	Ditto.
30	98·2°	Cinchona stopped; mineral acid given by mouth.
31	98·0°	

Typhoid fever diagrams.

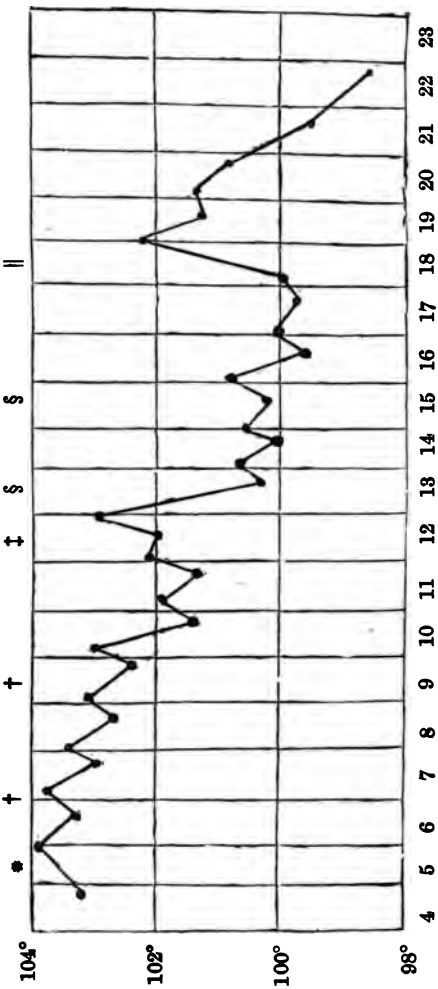
CASE 2.—A girl, æt. 8, seen after some days' illness.



* Four grains of cinchonine daily. † Diarrhœa. ‡ Rose spots. § Stimulants given.
‖ Omit cinchonine. ¶ Resume cinchonine.

Typhoid fever without diarrhœa.

CASE 3.—A girl, æt. 16, seen on the fourth day of illness.

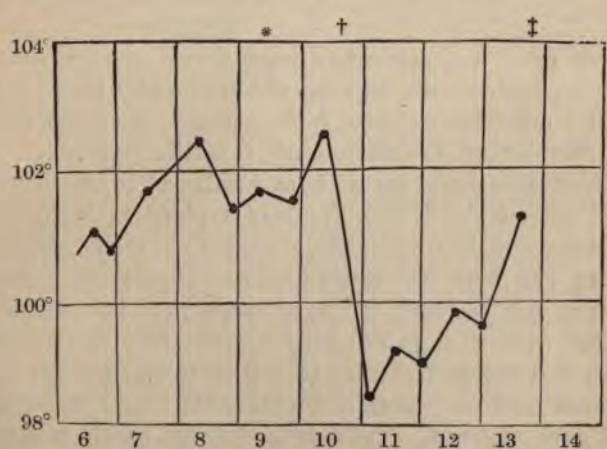


* Bronchial irritation. † Quinine given at night. ‡ Rose spots, abdominal pain.
§ Hæmorrhage from bowels. || Phlebitis in one leg.

CASE 4.—A girl, æt. 8½ years, after being ten days at the seaside in hot weather, but in healthy lodgings, takes aperient medicine unnecessarily. She feels tired and weak afterwards; the next day is fatigued by being too much out of doors, and becomes feverish at night; for six days she continues to be taken out, though the fatigue, fever, and loss of appetite increase.

Day of illness.	Pulse.	Resp.	Temperature, axilla. Morning.	Evening.	Remarks.
8	110	27	...	102·2°	Has travelled home by railway; ordered to bed.
9	100	30	101·6°	102·4°	No action of bowels; two lenticular spots on abdomen.
10	108	32	...	102·6°	Red spots very numerous; bowels inactive.
11	100	30	98·2°	...	Spots fading; constipation relieved.
12	...	...	100°	...	Some fresh spots on sides of chest.
13	110	32	...	101·2°	One or two new spots behind the shoulders.
15	100	30	...	99°	Bowels inactive.
21	...	...	...	...	Looks well; appetite returned.
30	...	...	...	...	To return to the sea.

Infantile remittent or gastric fever; constipation.



* One or two lenticular spots on body. † Numerous spots.
‡ One or two spots on shoulders.

Case 5.—A boy, æt. 3½ years, brother to the last, went to the seaside the day before the sister was ill; she came to him, but they were not much together; three days after he is sick in the morning, and his bowels disturbed twice; next day and the third day he is dull and languid, with no action of the bowels, and considerable fever.

Day of illness.	Pulse.	Resp.	Temperature. Morning.	Evening.	Remarks.
4	...	...	High		Castor oil acted twice; second relief is almost black.
5	108	30	...	101·4°	Has travelled home; yawns frequently; a sore spot on edge of mouth.
6	112	28	100·1°	...	In bed; tongue cleaner.
7	100	26	98·6°	...	Herpetic spots on lower lip; red spots seen on abdomen.
8	...	...	98°	...	Numerous red spots, like the sister's, over body; one light coloured relief from the bowels.
10	...	...	...	98·2°	Bowels are not quite right.
12	...	...	...	...	Better; appetite good; bowels natural.
15	...	...	98·9°	...	Slight diarrhœa for two days; today dysenteric; tongue pale, with thin fur.
21	...	...	...	...	Cheerful and well; pale; to return to the sea.

These cases are somewhat anomalous; the absence of diarrhœa, as shown in the case which precedes them, is not enough to distinguish them from typhoid; a sudden remission may occur in undoubted infantile typhoid. The lenticular spots could not without hesitation be called "rose spots;" they differed from those of typhoid in being more acuminate and less completely effaceable under pressure. Nothing can here be affirmed of the identity of infantile remittent and typhoid, for these cases were not altogether identical with what is generally termed infantile remittent, though had not perfect rest in bed been enjoined for some time after the first remission doubtless the febrile disturbance would have returned. The second case can hardly be classed with the mildest form of typhoid, yet the two cannot be dissociated.

Diagnosis.—The value of temperature observations in diagnosis can now only be slightly touched upon. While readily conceding the merit of priority to M. Henri Roger,[1] some credit may be claimed for having shown that the temperature variation of infants follows the same rules, and is within the same limits as that of adults, and is therefore as serviceable for purposes of diagnosis.

Typhoid fever, in its ataxic form, when it presents the greatest resemblance to meningitis is, as has been shown, readily discriminated from it by temperature. In the sthenic form of typhoid fever, an intercurrent bronchitis or pneumonia is accompanied by a greater temperature-disturbance than would be caused by either of these complications, while the disturbance of the pulse and respiration is less than that met with in simple pulmonary disease. Dysentery and enteritis are readily distinguished even from the slighter forms of typhoid by their lower range of temperature.

In scarlet fever, though the disturbance of temperature is often extreme, it is insufficient for diagnosis, or even for discriminating between it and a disease so nearly allied as influenza. In scarlet fever a temperature as low as 99° has been met with on the second day in a vigorous subject, with full rash, ending on the third week in desquamation: in influenza, with no other complication than full tonsils, the temperature may continue at 101° till the fourth or fifth day; with ulcers on the tonsils, or herpes of the lip and face, the temperature on the second day may even exceed 103°, and has been found at 102° on the third; a temperature less than this, generally very near 100°, is met with in the diffused bronchial irritation with which the more ordinary attacks of influenza begin; in both forms the difficulty of diagnosis may be increased by the presence of a finely diffused rash[2] on the chest and neck, either with the first symptoms of illness, or appearing after

[1] "De la Température chez les Enfans a l'état Physiologique et Pathologique." Par Henri Roger. 'Archiv. Gen. de Méd.,' 4me série, tom. v, p. 273. Paris, 1844.

[2] Of the two illustrations given of mild scarlatina the boy's case is probably of this kind; that of the girl was undoubted scarlet fever.

the application of the warm linseed poultice so useful for their relief.

A low temperature is often sufficient to enable a diagnosis to be speedily arrived at that otherwise must be uncertain or be delayed; a lad exhausted by fatigue and exposure has been found with symptoms that might have indicated either typhoid or scarlet fever except for this test. In laryngismus stridulus, as elsewhere stated, the low temperature invariably accompanying the associated states of irritation and defective nutrition, at once serves to distinguish the spasm from laryngitis, or from an affection symptomatic of serious organic disease.

It is seldom that a single temperature observation could or should be made the basis of a diagnosis; moreover we must remember that it is not to show what the *disease* is, but *how it affects the patient* that temperatures are taken. We have other means of diagnosis that special training must teach, to let us know what form of disease is present. To learn how the individual will bear it is the result of an experience difficult to impart; yet to know this is of as much importance, at least to the patient, as to know the name of the disease, and it is this knowledge which every temperature observation in some degree affords us; yet even here a series of observations is requisite, and experience must give them their value.

Elevation of temperature is useful as indicating the presence of disease generally. How often have the indications of the thermometer afforded the first revelation of unsuspected disease, pneumonic consolidation for example.[1] Absence of disease cannot, however, be affirmed because the temperature is not, at a given time, increased; many diseased processes end in a local process not always accompanied by high temperature; indeed, a low temperature has been found with quite recent congestion of the lung. On the other hand there are times

[1] It has frequently occurred to me to see children forced to exertion, and sent out (especially at the seaside) when a single temperature observation would have shown the necessity for rest, and have guarded against much consequent illness.

of life and states of system, when we meet with sudden rises of temperature not always betokening danger, but only the necessity for care. This is sometimes seen in the puerperal state from only a cracked nipple. In the period of most rapid growth in childhood there is a tendency to just such a state; the presence of a tooth at the gum, or of worms in the intestine, may excite it, but it has no special connection with teeth or with worms; it will occur as readily after all the first teeth are through the gum as before; it is referable to diathetic peculiarities, bad air,[1] bad nutrition, a wrong or defective food, and to rapid growth. Instances have occurred to me of a child growing ten inches in the first year with backward dentition, and only three inches in the second year: another, of slow growth in the first year with forward dentition, and a growth of seven inches in the second year. With this rapid growth, and with some instances of suddenly high temperature in other conditions, has been found associated *gastric* rather than pulmonary congestion, and it is in this association that the benefit said to result from the use of a mercurial aperient has generally been obtained.

Therapeutics and hygiene.—During any considerable elevation of temperature sleep is impossible, nutrition is interrupted, and waste increased; indeed, in a continued high temperature the tissues of the body not only waste, but are destroyed. Hence, empiricists have sought for remedies to reduce temperature; but the high temperature is a direct result of the diseased action present, and these remedies, which are useful in reducing dangerously high temperatures are those which have a controlling power over the disease, so that temperature may be a test of the suitability of a particular kind of treatment to the disease present. Hence the benefit of cold affusion and quinine in typhoid and scarlet fevers. Since using quinine in the early stages of the latter, whenever there was a tendency to a high night temperature and consequently to

[1] A high temperature is not only induced by the specialized poisons such as cause scarlet fever or influenza, but the emanations from bad drains will often cause a sudden rise to a temperature as high as 104° or 105°, which, however, may subside without serious consequences.

nocturnal delirium, the temperature has never reached so high a point as it frequently does when not checked in this way. This effect is equally remarkable in diphtheria, where the nocturnal delirium (so often noticed to occur in children, who, as Fothergill remarks, were quiet and sedate in the day) is a result of the evening exacerbation of temperature. The effects of quinine in this way are very marked in the early stage of these diseases, but it has no such influence in their later stages; not only this, but chloral, generally of service in hooping-cough, caused no lowering of temperature in one case, where the use of a weak solution of chloride of aluminium 15 grs. to 1 oz., used in the form of spray, by exerting a favorable influence on the condition of the respiratory tract, resulted in a diminution of temperature; the same thing has happened where the cough and the expectoration have been lessened by a combination of morphia and atropine.

Cinchonine has been found to have precisely the same effect as quinine; the muriate of cinchonine is cheaper, the powder in any dose is easily given in wafer paper, it readily dissolves with a very little hydrochloric or phosphoric acid, and is readily taken mixed with water and glycerine, to which a little chloric ether may be added. By means of cinchonine and quinine, in five- or ten-grain doses, the night fever of tuberculosis has been stopped; more than once has tuberculosis itself been arrested; the febrile stage of many diseases may thus be shortened or greatly controlled, and not only discomfort but danger avoided: indeed, what is effected by this remedy in ague is in some degree effected by it in other febrile states, the tendency to high temperature is checked and at length overcome.[1]

On the other hand, a marked increase of temperature results when the "eliminating" treatment is followed too closely.

[1] In the admirable essays of M. Henri Roger already referred to, 'On the Elevation of Temperature occasioned by Disease,' it is asked at the commencement, "Est il, parmi tous les mystéres de l'economie humain, quelque chose de plus dique de notre attention que cette force mystérieuse créé par la maladie?" In answer, we may compare with it that power from the vegetable world often great enough to control it, which is mysteriously created in the cinchona plant.

In the diseases here under consideration dilute the poison by all means, by pure air especially, and favour the subsidence of the diseased action. To eliminate a poison, if that were possible instead of eliminating the fluids of the body, we must remember that the quantity of poison eliminated can only be in proportion to the diseased action present, so that the diseased action must be increased in the process; moreover, if the last shred of desquamated cuticle in scarlet fever be infected, surely the last atom of living tissue must be, and if the body could be reduced to this and then restored, it would be restored in its state of scarlet fever, and resume the processes peculiar to it till they were accomplished.

Some points of hygiene are elucidated by temperature, to which there is barely time to refer. Dr. Finlayson has called my attention to a greater lowering of night temperature in children than my own observations bear out. Where I have found a temperature as low as 97° in the night, I have also found a low range of temperature in the day, and there seems to be a special connection between this and a dislike or a deprivation of fatty food. In a collection of facts any conjecture is an error, yet it is possible that this point might be eventually found useful in correcting the diet tables of workhouses and schools.

The following appendix of extreme and mean temperatures in some diseases of children may be of use:

Temperature in—	Lowest.	Highest.	Mean.
Pneumonia	...	105·8°	...
Pleurisy	99·0°	104·0°	101·5°
Peritonitis	98·7°	105·0°	103·0°
Dysentery	99·2°	101·2°	100·7°
Enteritis	98·7°	102·5°	99·0° or 100·0°
Pericarditis	100·5°	103·5°	101·5° in two cases with rheu-
Stomatitis	100·0°	102·0°	matism, and one after scarlet fever.
Thrush	95·0°	102·4°	
Meningeal tubercle...	98·0°	102·0°	...
Meningitis	95·?°	106·0°, once 108·4° just before death.	
Smallpox	98·7°	106·0°, once 105·0° the day before the eruption.	

These figures, excepting the result of fifty observations in pericarditis, and one in smallpox, are from the essay of M. Henri Roger, in which there is hardly a statement that has not been unintentionally verified in the course of inquiries which had been carried out independently and in ignorance of the good work there extant. At the conclusion of these essays M. Roger insists on the efficacy of the external use of cold water, whether by means of the douche, the sheet, or the bath, in moderating the severity, and even influencing the course of typhoid fever; this deduction of French science has been confirmed by the results of German practice, though the lapse of a quarter of a century has been necessary to establish it as one of the chief therapeutical results of that period.

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PUERPERAL TEMPERATURES.

PUERPERAL TEMPERATURES.

It is to the careful study of the natural history of disease that medical science owes much of its recent progress; and some of its surest advances have been guided by the systematic use of the thermometer, in marking the variations of bodily temperature that accompany the ingress of disease, the persistence of morbid action, and the return to health. To the record of observations of this kind, taken during the puerperal state, the paper now submitted to the Obstetrical Society is chiefly devoted.

The instruments used were two sensitive mercurial thermometers, made for me by Newcombe and Symons, ten inches in length, graduated, on Fahrenheit's scale, into degrees and fifths of degrees from 80° to 110°; one of them is self-registering: in a good light it is not difficult in either of them to read off tenths of degrees, by noticing whether the mercury is at one of the marks, or midway between two. The instances here given are stated in degrees and tenths of degrees, all of them having been read off direct from the same instrument; the self-registering one (though obviously convenient for many of the observations obtained) not having been depended upon for those here recorded.

The axillary temperature affords reliable indications during the puerperal state. A very sensitive thermometer, made by Casella, afterwards enabled observations of this kind to be obtained without inconvenient delay. Subsequently Mr. Hawksley, of Blenheim Street, made for me an extremely

sensitive self-registering thermometer three and a half inches in length, graduated from 95° to 110° in the manner described above; this is safely worn in the waistcoat pocket, and seems to be as nearly perfect as possible; most of the additional observations appended to this paper have been made with this instrument. Very excellent thermometers are also made by Mr. Roberts, of Rydon Crescent. A good instrument, to be useful, must be sensitive as well as accurate; it should also be self-registering.

Some comparative observations on variations of temperature are first to be given, together with those normal to the state of pregnancy, as far as they have been noted. The different phases of pregnancy could not fail to be illustrated by a further investigation, but opportunities of conveniently making observations of this kind, that shall be in every way unexceptionable, are not frequent.

The temperature of the body is somewhat increased during pregnancy, at least in the latter months. The normal temperature may be taken at 98·75°, the temperature after the sixth month of pregnancy will frequently be found somewhat over 99°. A variation is to be observed in different persons, and in the same person in different states of health; the limits of this variation, as consistent with health, having been restricted in the cases I have noted, to one degree, viz., from 98·8° to 99·8°, its range being less than in women of similar age when not pregnant. Some remarkable oscillations of temperature, such as we need not expect to find in pregnancy, have occurred in a few cases that have presented themselves to me for notice, which tend to show that there is a considerable fall in temperature on the occurrence of the catamenia, and a variable rise shortly before: in one instance the vaginal temperature was found to be 99·8° on the day before the catamenial flow, and only 97·3° on the day after. No observation was obtained on the intermediate day; the flow was not very free, and was unaided by alcoholic stimulants, indeed, these had been abstained from for nearly a month, until this day, when they were resumed; three days afterwards the temperature was 98·7°, the period being then

over it had been in every respect normal, yet there was a fall of 2½ degrees in the first two days of its occurrence. In another case, where a vaginal operation was performed on the day preceding the expected period (which recurred with perfect regularity), the local temperature was 100·1°; eighty days afterwards, though there was some persistent local irritation, the thermometer did not go beyond 98·7°. There may be considerable pain, tenderness, and sensation of heat, without the thermometer being much affected; in a case where these conditions were all present from the too free application of undiluted liquor plumbi to verrucæ of the labia minora and fourchette, the local temperature was only 98·9°, and even this was accompanied by a slight increase in the general temperature as taken in the axilla.

The difference between the vaginal and axillary temperatures will seldom be more than one third of a degree, and frequently only one fifth or one tenth, if in the latter situation all the requisite precautions to secure accuracy are observed. In this way 98·45° was obtained as the normal temperature in the axilla, and 98·75° in the vagina, where there were no disturbing circumstances; in a case of abortion at two months, the vaginal temperature on the ninth day was 98·4°, the axillary temperature 98°.

A comparison of these differences was made in the puerperal state; first, on the second day of delivery where slight perinæal fissure existed, the temperature there was 98·5°, in the axilla 98·3°; so that a local injury had not disturbed the usual relative temperatures: second, on the fifth day of delivery, where the breasts were very full and tender, the milk increasing, and the lochia decreasing, the axillary temperature had risen to 100·3°, the vaginal temperature was 100·7°; so that while in full activity the mammary gland does not, by its proximity to the axilla, unduly influence the results there obtained by the thermometer: in the third case, on the ninth day, a final application was required to complete the cicatrization of a perinæal fissure, the temperature there was 98·3°, that at the axilla 98·2°; in this latter situation there was probably now less difficulty in obtaining the true

temperature, on account of the process of lactation being in full activity.

The observations of puerperal temperatures, except in the instances especially noted, are all taken, as in ordinary illness, by placing the bulb of the thermometer in the axilla, being careful that it is in contact with both surfaces of the skin, that perfect contact is maintained for a sufficient time (*which should not be less than three minutes*), and guarding against the loss of heat that might be occasioned by evaporation from the surface, or from incomplete covering. There is not only no difficulty but considerable convenience in this method of watching progress through the lying-in state; the time occupied in other necessary inquiries, suffices for obtaining the required indications of the thermometer, which, when satisfactory, save further trouble and anxiety, and when not exactly as is to be wished and expected, give timely warning that precautions are needed.

The commotion and efforts of parturition itself, while confined within the ordinary limits of natural labour, cause but a slight elevation of temperature. In the twelve cases, of which tabulated diagrams accompany this paper, this point was made the subject of exact observation in Cases 1 and 9 In case No. 1, on the diagram, the labour was of short duration, but of some severity, with considerable agitation, heat, and perspiration, and the development of the passages proceeding rapidly; the axillary temperature could not be obtained at even the usual standard; there was, however, a progressive increase shown by the thermometer used in the vaginal examinations; the highest reading, obtained half an hour before delivery here, was 99·9°, in the axilla only 97·8°. In case No. 9, where the labour was more rapid, but much less severe, the temperature per vaginam, two hours after the commencement of labour, was 98·9°; in a similar observation. taken twenty minutes before the expulsion of the child, it was 99·1°, and ten minutes after, exactly 99°. Where labour is more prolonged the temperature is raised in proportion to the severity and duration of the muscular exertion demanded, so that a temperature from 100° to 101° is by no means in-

frequent, and a degree of 102 has been reached, and even exceeded, where the labour has been both protracted and severe.

The elevation of temperature thus occasioned, is maintained to the termination of labour; then commences a steady decline, which in most cases, if not all, has reached the normal line and in some has descended considerably below it. This subsidence always takes place in the first twenty-four hours; it may, however, be prolonged into the second day, as in Case 9, or be accomplished within the twelve hours, as occurred in Case 6. In this case delivery took place at 3 a.m. with some hæmorrhage, sleep followed and the mammary secretion was rapidly established. In Case 9, a short labour terminating at 11 p.m. with no loss of blood and followed by excitement rather than sleep, the lowest point was not reached until the second night, thirty hours after delivery. In Case 4, delivery at 7 a.m.; the temperature at 2 p.m. was 99·4°, she had not slept, had only taken gruel, she herself felt cool and rather faint; after sleep the temperature soon subsided to the ordinary degree. A difference is noticeable in following the line of temperature here, it is the only case of this series in which suckling was not attempted. In Case 1, the high temperature noted during labour had fallen four hours afterwards to 99·2°; the diagram in this case gives the simplest form of disturbance of temperature common to the puerperal state.

In all the cases here investigated, the most constant and most obvious disturbance of temperature is that which ushers in, and accompanies, the formation of milk. The commencement of this reaction is most regular; it attains a certain prominence forty-eight hours after the birth of the child. In only one of these twelve cases was this rise of temperature retarded, in only two was it accelerated. The termination of this reaction is most variable; the modification which the line of temperature now undergoes from the merest accidents, before it settles down into the normal line at the period of convalescence, fully warrants the care and watchfulness at this time traditionally conceded.

Where the secretion of milk is readily established, the rise in temperature necessary to its formation at once experiences a considerable fall; this is shown in Nos. 1, 3, 6, and 9, where a fall of at least one degree occurs within twenty-four hours, in the last three the temperature has in that time fallen to a point as much below the ordinary temperature as it had previously been above it. In these cases there was at the same time a very free flow of milk. When, instead of a free secretion of milk, there has been an abundant lochial flow, then, not only is there no corresponding fall in the temperature at this time, but a higher range is maintained throughout, than where lactation proceeds. This is well illustrated in the last diagram.

To obviate any sources of error due to diurnal oscillations of temperature, observations were taken in Case 2 twice every day between nine and ten o'clock morning and evening until the fifth day, at noon on some of these days, and in the afternoon on the subsequent days; these showed a uniform progression in the direction indicated, and it was not until the puerperal state was nearly over, and the convalescence well advanced, that the ordinary diurnal variations of temperature again became evident. This case was that of a younger person than those previously referred to, lying-in with her second child; the secretion of milk not so quickly elaborated; the tendency to a fall of temperature is shown on the fourth day, when it would probably have been completed had not constipation on that day occasioned a sudden rise of half a degree, with as sudden a fall upon its relief, unless, indeed, this rise (which was only to 99·1°) was necessary to the free establishment of the mammary secretion, and the cause rather than the consequence of the constipation.

In Case 4, where the mammary function was never excited into activity, the first rise in temperature is more gradual, hardly reaches the same height as the other cases, and subsides more slowly. There could not be a greater contrast than is shown by this case and the two others in the same diagram (Table II); in all three the ages, health, and general conditions were very similar, all had borne

several children, but Case 6 was the only one that had habitually given suck, and the rapidity of the usual changes of temperature in this case, has been before alluded to. A similar rapidity of subsidence with a still more marked reaction is noticeable in Case 5, in which a tedious labour with twins was terminated at 11 p.m., by turning the second child; sleep followed; an egg was taken at breakfast, and chicken for dinner; the temperature at noon was 98°, at night 99·9°; the secretion of milk was plentiful after the fifth day; both children were suckled and the case progressed favorably, but the high line of temperature (100·3° on the third and fifth days) shows the difference between recovery from a trial of this kind, and that from the more ordinary accidents of Case 6.

Cases 8, 10, and 11, were primiparæ; in all, the milk process was slowly settled. In Case 8 there was a less rapid recovery from the first low stage of temperature, which continued through the third day. Even in this case a slight rise of temperature on the second day seemed to indicate the occurrence of the expected phenomena, but a restless night was followed by another day of low temperature; the next night some brandy and egg procured sleep, aided the rise of temperature from 98·4° to 99·9°, and enabled the milk process to be actively carried on; this was not without some discomfort at first, and the temperature for two days continued high, it came down to 98·6° on the eighth day, and the mother eventually became a good nurse. In Case 10 the usual wave of temperature followed labour, but its subsidence was arrested by trouble in the breasts, the nipples cracked at first, afterwards fibrinous pellicles formed on the papillæ of the nipple, and once or twice there was fear of some of the ducts remaining obstructed: it was a question of management throughout whether the breasts should inflame or the milk be diminished; on the twelfth day the former alternative threatened but was avoided, the temperature at the same time running up in one afternoon from 100° to 102°, and coming down three degrees in the next two days; after this the milk was thin, and though not plentiful, would too

readily escape; at the end of two months it ceased altogether. In Case 11 the low stage was rather more marked than usual; delivery was at 3 a.m., followed by a slightly excitable state and no sleep; the temperature was slow in subsiding; at 2 p.m. it was still 99·4°; at noon next day it was lower by a whole degree; the rapidity and intensity of the subsequent rise is very notable; by 3 p.m. on the following day it reached 103·3°. On the eighth day it was 103·6°, it then fell a degree and a third, viz., 102·3°, only to rise the next day to 104·37°; it was not till the fourteenth day that it subsided from 103·3° to 100·8°, and the day after to 99°. The temperature was quite normal by the twenty-first day, and at the month's end the patient had become active and strong again, and was gaining flesh, and made a thoroughly good nurse. The possibility that a temperature so elevated should be maintained by the body for twelve days, without either function or organ suffering, is most remarkable.

Chloroform was given in these two last cases, but it could scarcely have influenced their progress, as in Case 11 only half a drachm was consumed, and in Case 10 it was of great service throughout the last two hours of labour, and neither sickness nor headache attended or followed its use; nor were its effects traceable in any of the subsequent conditions, unless a rigor fifteen hours afterwards could in any way be attributable to it. The temperature six hours after delivery in this case was high, 99·5°, but was down to 98·5° within the twenty-four hours.

Chloroform was given also to the same extent in Case 3, and there seemed to cause depression; the temperature six hours after labour was down to 98°, and in twenty-four hours was below 97°; its effects were also noticeable in an intermittent pulse to the third day, yet good progress was uninterrupted, and in no case was a more favorable and rapid recovery attained.

Alcoholic stimulants were given: in—

Case 1, on the third day with food and continued.

Case 2, not till the evening of third day.

Case 4, once on the third day, and not again till the seventh, when they were continued.

Case 5, no stimulant allowed till the eighth day.

Case 6, at noon on the third day and continued.

Case 7, was never discontinued.

Case 8, a little on the third day, and with meals on the fifth day.

Case 9 on the fourth day; no stimulants taken for many weeks before.

Case 10, stimulants taken up to and during labour, none after till tenth day.

Case 11, unaccustomed to stimulants; a little on ninth day and discontinued.

Case 12, abstains from stimulants altogether and trusts too much to farinaceous food and slops; a little wine was taken on the twelfth day, but it was said to check appetite; the rise in temperature on the fourteenth day was attributable to the commencement of active exertion under these circumstances; a freer diet and more careful rest, both contributed to the subsequent fall of temperature; nursing has now been continued nearly six months, with more ease than on former occasions.

Case 7 is, in many respects, the converse of this one, the fall of temperature was checked by brandy; the subsequent rise steadied and maintained by stout; on the sixth day some difference had to be made on account of heat, and pain of the left breast; suckling has since been easy, but the involution of the uterus was retarded, and coloured discharge occurred throughout the month.

In one case, the particulars of which were not recorded, where a high temperature continued after the flow of milk was free, the use of alcoholic stimulants resulted in abscess of the breast; in another case, where the same conditions existed, by withholding stimulants till the temperature subsided, a similar risk was avoided, and nursing was well performed afterwards. In such cases the thermometer is a safe guide, and should therefore be used in every case, if it were only for this one indication.

Where the secretion of milk is free and the temperature low, alcoholic stimulants are safe and beneficial as adjuncts to food:—their use may be serviceable and even advisable where the milk secretion is not free and the temperature still high, so long as no local mischief threatens in the breasts:—they are not suitable to the stage of low temperature which succeeds to labour; at this time warm diluents, and solid food best aid the expected reaction.

The state of the bowels as noted in these twelve cases is, that they acted naturally every day in only one case, No. 4; they acted without assistance on the second day in *two* cases, Nos. 7 and 12. An enema was used in Cases 2 and 3. Castor oil was given on the fourth day in Cases 6, 8, 9, and 11; in the first two of these only was its action beneficial, in Case 9 an enema would have been better; and in Case 11, an earlier use of it might have been serviceable: it was given on the third day in Cases 1, 5, and 10; in the first case its action only checked the flow of milk for that day; in Case 5 it acted rather freely and it was thought at the time injuriously; in Case 10 it is noted in the report of the case the day after, that "the oil has checked the secretion of milk, but has not reduced the temperature, an enema would be better."

The general conclusions offered to this Society as fairly deducible from these observations are—

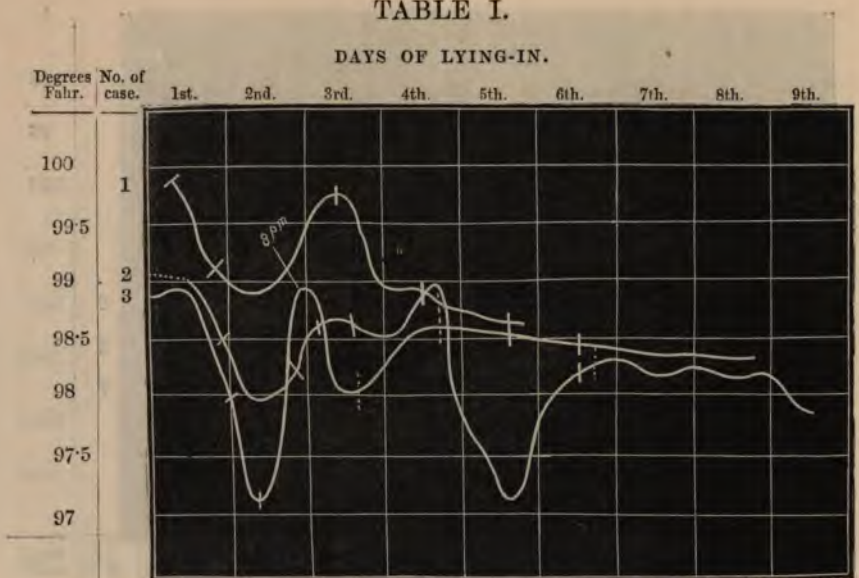
1st.—That some elevation of temperature arises in natural labour.

2nd.—That there is afterwards a considerable fall of temperature which is favoured by sleep.

3rd.—That there is a subsequent exaltation of temperature which has for its natural termination the secretion of milk.

4th.—That the bringing the method of observation here followed to the study of the puerperal state, would add an element of certainty to the principles and details of its management, and afford an additional guide for safe conduct through some of its complications.

TABLE I.



The transverse marks indicate the times of taking the observations: these are not in all cases given.

TABLE II.

DAYS OF LYING-IN.

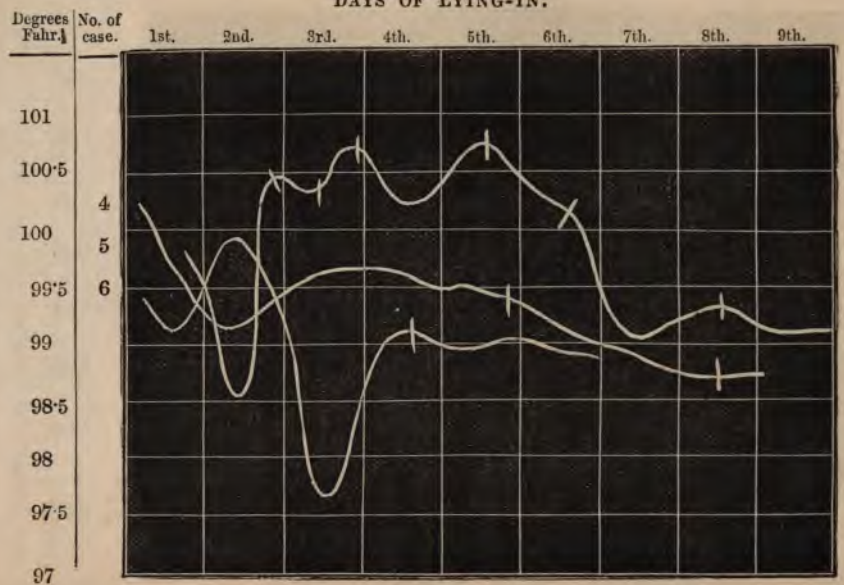


Table III.

DAYS OF LYING-IN.

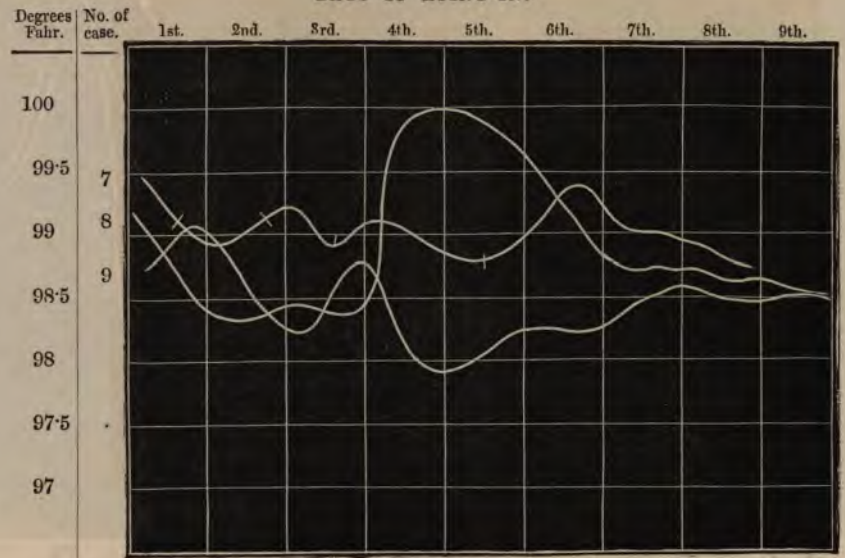


TABLE IV.

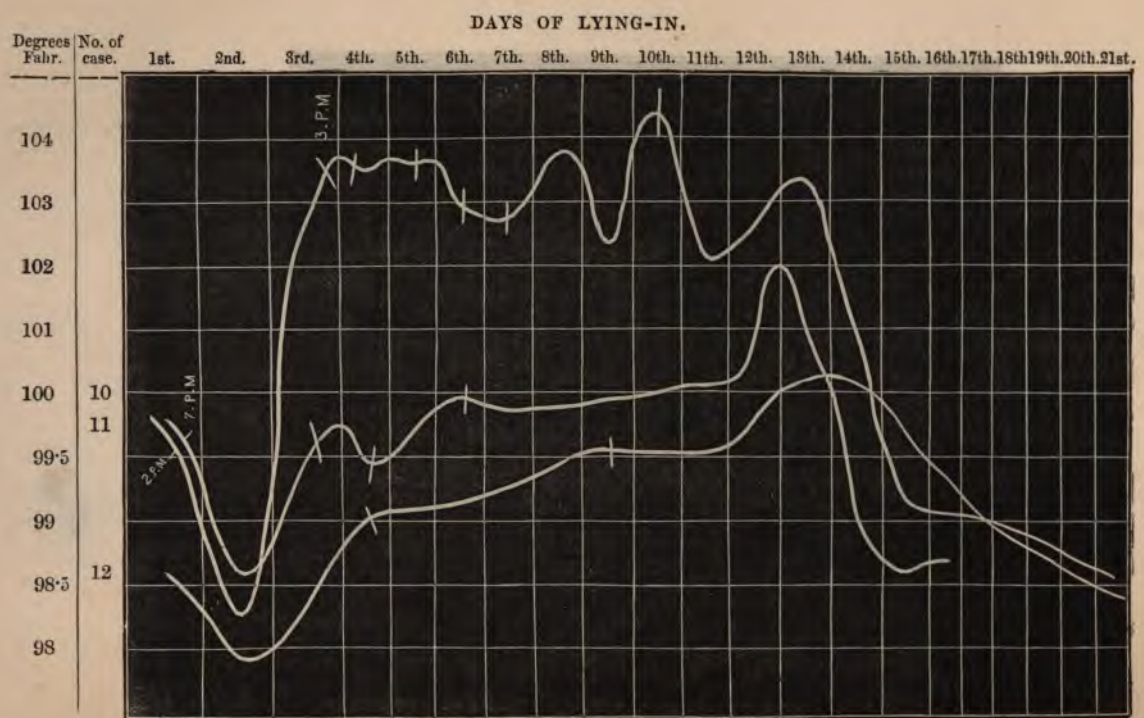

DAYS OF LYING-IN.
Degrees Fahr.
No. of case.
1st. 2nd. 3rd. 4th. 5th. 6th. 7th. 8th. 9th. 10th. 11th. 12th. 13th. 14th. 15th. 16th. 17th. 18th 19th. 20th. 21st.
104
103
102
101
100
99·5
99
98·5
98
10
11
12
3. P.M
7. P.M
2. P.M

TABLE V.

Cases I and II.

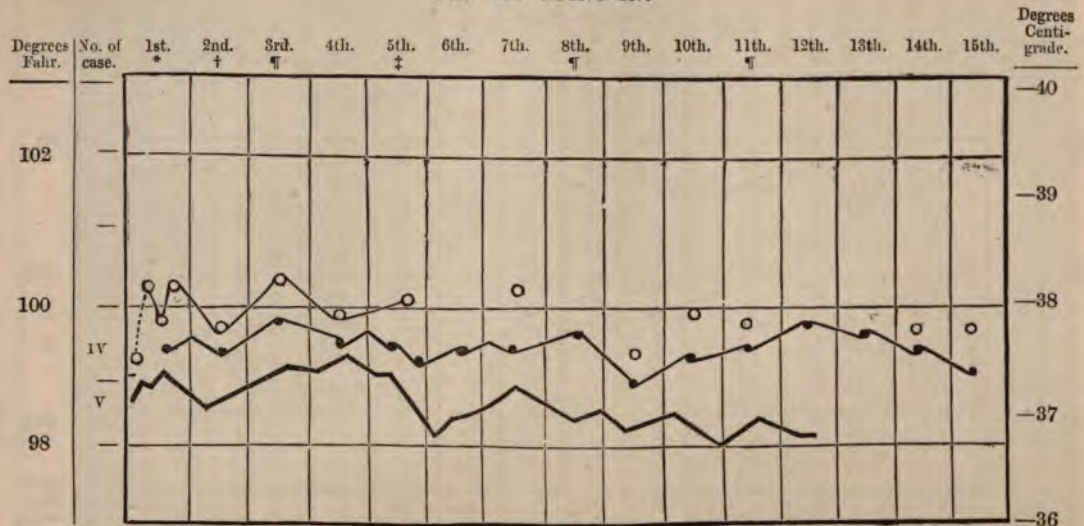
DAYS OF LYING-IN.

Case III.

DAYS OF LYING-IN.

TABLE VI.—Cases IV and V.

DAYS OF LYING-IN.



* Sleep.

† Meat for dinner, with a little wine.

‡ Alcoholic stimulant; perspiration followed.

¶ Castor oil given.

The last diagram is illustrative of a method found to be convenient for recording the temperature changes and progress of any case under observation. Vertical lines for a series of days, are drawn across six or eight of the ruled lines of the notebook, or of ordinary ruled bath post paper, which serve to indicate degrees of temperature; of these the alternate lines are strengthened by drawing the pen horizontally along them, to guide the eye to the degrees 98° and 100°. Space is left above for marking off lines of higher temperature, for headings, or marks of reference. Below there is space for any comments or references that may be useful or necessary, the frequency of the pulse and respiration being entered immediately at the foot of the column for the day. In this way an abstract of each case is presented to the eye, most useful for reference and comparison.

While the elevation of temperature occasioned by parturition varies with the degree of effort required, it will be seen that the subsidence of temperature after labour is remarkably constant. This period of low temperature is an interval marked by nature for the administration of really good food; where this opportunity is neglected, not only is the period of low temperature prolonged, but there is afterwards a tendency to sudden increase of temperature, not always subsiding without danger.

This investigation, having for its original object the proper management of the puerperal state, had almost conclusively proved that the diet in child-bed should be substantial; some of the cases now added show that alcoholic beverages in moderate amount may be advantageously added to food; but that, while the food is essential, and should be looked upon as always necessary, the stimulant must be the subject of special order. The limitations of diet to "tea, toast, and farinaceous food," after parturition, and the directions for "simpler food, less in quantity," during the latter months of pregnancy, to be found in popular works on these subjects, are without warrant, either in science or practice; nor ought these articles of diet any longer to hold their place as principals in popular notions, but as accessories.

The first case represented in the diagrams now added is one bearing upon this question. This lady, thirty years of age, had not gone on well with her two previous pregnancies; the first child, born somewhat prematurely, died suddenly a day or two after birth; in her second confinement there was trouble in nursing, and she suffered from what was called puerperal hysteria, with fever, delirium, and albuminuria. On again becoming pregnant the first defect noticed was in the teeth; this was remedied, and mastication, hitherto imperfect, was rendered efficient; good food was taken well, and evidently was required; the health and strength improved; all traces of old delusion disappeared. After delivery an egg with half an ounce of brandy was given at night. Meat was taken next day and on every succeeding day, as well as two eggs and half an ounce of brandy. The secretion of milk began on the third day, but was not very free till the sixth. Castor oil was only given once on the fifth day, as the bowels had acted naturally before that, and continued to do so afterwards. At this time meat and vegetables were taken twice a day, and wine instead of brandy. On the seventh day stout was commenced, and tincture of quinine was given before both luncheon and dinner. Generally a short sleep was obtained early in the afternoon. The child was suckled efficiently; the mother was able to take exercise in the open air during the third week. On the seventeenth day, after being out a little too long, the axillary temperature, which for some days had been below 99°, was raised to 99·7°. Once on the twenty-third day this was found at 100°, not from going out, or from bodily exertion, but from the emotional effort required to reprimand and dismiss a servant.

In the next case (11) the patient was thirty-eight years of age; this was her third child; the labour was not severe; the depression of temperature to be remarked just after delivery, probably owing to slight hæmorrhage, was soon restored after taking a little gruel and obtaining a short sleep; she passed a good night, with some perspiration. Next day, observations, both axillary and vaginal, showed a real subsidence of general temperature; beer and cold mutton were taken at a midday dinner.

On the third day castor oil acted freely, a good dinner was enjoyed, the breasts were filling well, but there was not a very free flow of milk till the sixth day; the lochia were never very abundant. It may be noted here that the open dots in the diagrams indicate observations of vaginal, and the black dot of axillary temperatures. Upon first sitting up, on the tenth and eleventh days the temperature, now nearly down to the normal line, experienced a slight elevation; it was, however, found below the normal both on the twelfth and fourteenth days, and twice also in the third week, when the patient was down stairs and engaging in some household duties.

By reversing Table v the tracings of temperature in Case III can be followed. A primipara, twenty years of age; nursing prohibited from previous intention. Labour began early in the morning, and terminated favorably at half-past twelve; chloral-hydrate was given in two half-drachm doses at 8 and 10 a.m.; during this time the temperature continued to rise; it was 100° at the termination of labour, and had risen to 101° by night, when after good sleep, there was the normal subsidence. The pulse rose from 80° to 100° on the first day, and the respiration to 30 in the minute; on subsequent days these were generally 80° and 20 respectively, and sometimes less; sleeplessness, several nights before labour, had been satisfactorily obviated by chloral without any resulting headache, constipation, or loss of appetite. After labour the ordinary meals were taken every day, with perhaps less than the usual supply of farinaceous and liquid nourishment; the bowels were relieved by oil on the third and fifth days; no alcoholic stimulant was given. Though the breasts never became tense or painful, a very free secretion flowed from them on the fifth day, and continued to flow till the tenth and eleventh days; the lochia, never very abundant, had diminished considerably by the eighth day; wine was now added to the diet. On the tenth day the patient was up and about; she walked down stairs on the fourteenth day, and took stout; there was thus a slight rise of temperature occasioned, which subsided with more rest and less stimu-

lant. Soon after this, however, the patient was able to walk out.

The first case (IV) on Table VI may be usefully compared with the preceding. This lady, aged thirty years, was unable to suckle her infant, but not intentionally; her previous labour, seven years before, had been severe and the child stillborn; the fact of lactation having been thwarted then, might have something to do with the failure of that process now. Chloroform was given during the last two hours of labour; afterwards there was some slight hæmorrhage; the temperature was at the same time a little depressed; it was, however, restored by evening, and subsided in the night with sleep. The normal reaction took place on the third day, but resulted only in an abundant discharge of green waters. On the fifth day any tendency to fulness of the breasts seemed to be subsiding rather than increasing; the secretion of the milk was less, nor was it influenced by giving a little extra alcoholic stimulant in the middle of the day; indeed, this seemed only to cause perspiration and a subsequent lowering of surface temperature. On the eighth day a loaded state of the rectum was detected; there must have been some accumulation going on since the fourth day, though a partial relief had been each day obtained by the use of the enema; this of itself occasions a certain elevation of the temperature, and illustrates the necessity for the use of castor oil. The child was kept much near the breast, and occasional efforts at suckling were encouraged till the twelfth day, when they were discontinued with evident benefit to the mother's progress. The lochia, which had been abundant till the ninth day, now diminished: it is to be remarked how little the temperature changes are influenced by the varying amount of this secretion. The references and figures at the foot of the diagram belong only to this case.

Contrasting with the last case is the one, Case V, traced immediately below it in the diagram. Of the same age as the last patient, this one had already four children, and had been able easily to nurse them all. A free secretion of milk was established by the fifth day without discomfort. On the sixth

day the temperature was below the normal, the lochia being almost *nil*. The pulse and respiration, less disturbed at first, afterwards corresponded very closely with the observations recorded for the other case, and were exactly the same on the tenth and eleventh days, this patient being up while the other was in bed. In this case the rapid subsidence of temperature is seen to be closely connected with the ready formation of milk, while another illustration is here afforded of how little that subsidence is dependent upon the amount of the lochial discharge.

Chloral-hydrate was taken, in the last of these cases, at night when the pains were first felt; some mitigation of pain but no sleep followed; a further dose was taken four hours after, near the end of labour, too near, in fact, for it to have much effect on the pain then; but as after pains were expected, some good was anticipated; these were not prevented, but uterine contraction was good; a third dose relieved the pain, but did not at once cause sleep. The child seemed unaffected.

Chloral is a valuable addition to our means of relieving cough, restlessness, and some other discomforts of the latter stages of pregnancy; neither when given at this time, nor during or after delivery, has it been found to have any direct effect in depressing temperature. Too much reliance should not be placed upon this remedy for the relief of after-pain; it will surely induce sleep, and it does not interfere with the secretion of milk, but the frequent use of this medicine by the mother has sometimes seemed to cause slight sickness in the child. In other cases where this agent has been used to procure sleep after delivery no inconvenience has followed its use; the effect upon the child through the medium of the mother's milk being certainly less, than it has appeared to me to be through the medium of the maternal blood when largely administered to the mother for some hours before the child is born.

Hydrate of chloral has some effect in lessening the suffering from labour-pains without diminishing the power of uterine contraction. It would seem to be more suited to the early

than to the later stages of labour, when it could only be advantageously used in cases where a very small quantity of chloroform would answer the purpose. It is, moreover, worthy of remark that both these agents, when given largely, have a like injurious effect upon the child at the time of birth, weakening the pulsation in the cord, hindering, or even sometimes endangering the commencement of respiration, and often on the second day giving rise to troublesome sickness.

Chloroform when administered during labour does not interfere with the elevation of temperature then usual, and may even tend to its increase; so that in cases of first labour the full effect of the anæsthetic should not be obtained so soon, as it would probably have to be maintained longer, than in other cases. Chloroform has been largely inhaled by those who have previously borne and suckled children, and has in no wise interfered with lactation; yet two or three instances among primiparæ can be called to mind where after the use of chloroform nursing had to be relinquished. This result may in part be attributable to the chloroform; it must also have in great part been owing to the prolongation of labour, which in each of these cases was severe. Sometimes there has appeared to be a great increase of heat under chloroform, yet this results from the amount of effort exerted, and not directly from the chloroform, for upon giving it earlier in labour a very slight increase of temperature has been noted during the first hour of its employment, and a considerable elevation as much as half a degree in half an hour, during the second and third hour of its influence. In one such case, where the somnolency continued, the temperature quickly fell more than a degree after delivery. In other cases the ordinary subsidence has occurred. In Case IV the temperature continued to increase after labour was over; this also happened in Case III where the hydrate of chloral had been given in repeated doses. In administering chloroform during severe and prolonged operations some increase, or at least no dimunition of temperature, has been met with in the first part of the unconsciousness produced; afterwards, a considerable fall has

in some few instances occurred, in one of these, resection at the hip, the lowering of temperature seemed as much owing to loss of blood and the exposure of a large surface of the body, as to the special effects of chloroform.

Alcoholic stimulants are sometimes useful in aiding the subsidence of temperature immediately after labour; they may be absolutely necessary in many of the states of depression then met with, and are generally more likely to be required soon after labour than on the second or third day. In estimating the tendency to subsidence of temperature after delivery, allowance must be made for the hour of the day at which the labour terminates and the subsequent readiness to sleep.

INFANTILE TEMPERATURES

IN

HEALTH AND DISEASE.

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BY

WILLIAM SQUIRE, L.R.C.P. Lond.

In the endeavour to give to the study of infantile disorders, a certainty approximating to that which we bring to the investigation of the diseases of adults, exact observations were wanting, not only in the temperature changes of the earliest period of infancy, but even in the ordinary variations of the pulse and respiration. To supply this want, more felt when the patients cannot give an account of their ailments, is attempted in the first part of the present paper.

The temperature of the infant at birth is that of the mother, so that generally it will be about 99°. Taking the two extremes of temperature at birth, where the mother's temperature has exceeded 100° the child's has also; and once, when the temperature of the mother was as low as 98°, so was that of the child. In these cases, as in several of the more ordinary instances, special means were taken to ascertain this correspondence by inserting a thermometer of small bulb and long index within the spincter ani of the child immediately after birth. This same thermometer has been made use of in all the subsequent observations.

The point of interest next to be noticed is the uniformity with which the infant acquires that particular degree of temperature (98½° to 99°) which is to become the index of the health of the individual, literally from the cradle to the grave.

To take an ordinary instance: (Case 1) a boy born quite at

the full period without undue difficulty at 1.30 p.m., the temperature taken in the rectum at 2 o'clock, was 98°·4, the child having been but slightly covered in a not very warm room; the surface generally was colder, but at 3 o'clock after the child had been washed and dressed, 98°·4 was easily obtainable in the folds of integument at the neck. At 8 p.m. the temperature taken at the neck was still 98°·4, and next morning the same, though the night had been passed sleeping in a bassinet; little or no food had been taken as the child seemed too well nourished to have much disposition to suck. At 11 a.m., after washing and dressing, the surface temperature in the neck was 98°·8. During the month the supply of breast milk had to be supplemented by the bottle, but the temperature was always found close upon 98°·4. The child was weaned in the second month, and after some variations the temperatures taken during a week were all nearly the same.

Of two children born prematurely, both at the period of eight months, the one, a boy (Case 2), twelve hours after birth had a temperature of 98°·7, very nearly what it was at birth; the next day the rectal temperature was 99°, though only a little water and sugar of milk had been given; a wet-nurse was then obtained, and after some irregularity at first, the temperature for several days continued between 98½° and 99°: the other, a girl (Case 3), having the extreme of high temperature at birth, was considerably below the average on the second and third days after; on the fifth and sixth days there was a temperature of 98°, though the advantage of suitable nourishment was wanting.

The extreme instance of low temperature at birth (Case 4) was a girl, supposed to be beyond the full period, and certainly of full size; the cord was in a tight knot, and some little time elapsed before respiration was perfectly established; six hours after birth the temperature *in recto* was still 98°, the surface had become warm and of good colour, nothing had been swallowed and no urine passed; next day there was a rise of half a degree; after that, the supply of breast-milk being very free, 99° was always obtainable, whether the child were

close to the mother's side in a greater heat than seemed wholesome, or exposed in washing and dressing to a lower temperature, and for a much longer time than seemed prudent.

The diurnal variation of temperature, which becomes the rule of later life, is hardly to be observed in young infants; their sleep comes as readily in the day as in the night, and their food is often as easily within reach in the night as in the day. A somewhat higher temperature is found in the latter part of the day by the fourth or fifth month, but even then a great difference between the morning and evening temperature would indicate want of attention on the part of the nurse, or delicacy of constitution in the child, or both. A marked increase of temperature towards night has been established by Dr. Sidney Ringer as a sign of tuberculosis.

Food is the source of heat, and the equality of temperature in early infancy is mainly dependant upon fitness of food and frequency of feeding. Two hours, or if the infant has been sleeping, three hours may be requisite for a full meal to influence the temperature of a healthy child: thus of three observations taken in the second month, in Case 1, two were taken within an hour of the mid-day meal, giving 98° and 98°·2 in the neck, 98°·6 in the rectum; the third taken at 3 o'clock was 99°·1 in the neck, the child had been sleeping since its meal, which was a full one.

The immediate effect of a meal, or of warm liquid merely, in raising the temperature of the body, as pointed out by the late Mr. Stuart, has been too generally stated; it has rarely been noticeable here, probably because of the care taken to avoid giving infants their food too hot: once this was allowed with the following result. In the case just given (Case 1) the infant when three months old was restless and in some pain; the diet being equal parts of milk and water, some curd passed undigested; the child had been recently crying much, the temperature was 98°·2 in the rectum, and until the descent of some fæcal matter was only 98°. Four ounces of thin, sweet liquid at a temperature of 101° was given in a tube bottle, the half of this was taken while the temperature was near 100°, and most of it while above 99°. In a quarter of an hour the

rectum temperature reached 99°·4 during the passage of a considerable quantity of liquid fæces, in another quarter of an hour the temperature in the rectum was still 99°.[1]

When the child has suffered weakness or want, a direct increase in the bodily temperature follows the administration of food. Thus, in Case 2, before noon on the fourth day, the child neither having been washed that morning nor fed for some hours, the surface temperature was 97°, and that *in recto* only 97°·4; after suckling the temperature quickly rose to 98°: the next day it was 98°·4. Also, in Case 3, when the child not being suckled for the first three weeks had thrush and was in danger of death from inanition, the debility was too extreme when the child was put to the breast for an immediate effect to be produced by the new food; twice the temperature had been near 96°, once even down to 95°, and generally not much above 97°; during the first two days of breast-milk the temperature was only 97°, it became 98° both *in recto* and in the folds of the neck by the evening of the second day, when it was also as readily obtainable at the surface as the interior of the body; there were at the same time other signs of the return to health of the mucous membrane as well as the skin: on the third day the child was washed and dressed after three hours sleep; at 10 a.m., without being nursed, the temperature was 97°·8 on the surface, and less than 98° in the rectum; a full meal was then given, which caused an increase of a whole degree of temperature; before noon, the child sleeping, 98°·8 was easily obtainable in the folds of skin at the neck.

More frequently the influence of food or of warm liquid is seen in developing upon the surface of the body a temperature already existing within. Cold bathing has a marked effect in this way on the healthy child, and while no stimulant

[1] Adults frequently swallow hot liquids, especially tea, at a temperature over 130°. Infants are more judicious; it has been noticed that when, as not infrequently happens, their food has been offered at too high a temperature, they will play with the tube and take but little till the temperature falls. A thermometer placed in the bottle will be at 99°, or below, at the time the food is swallowed freely.

is so valuable as food, the influence of the bath in equalizing the temperature of the body ought not to be overlooked; the greatest effect in raising the temperature of the surface is produced by the combined effect of both. Where the circulation is feeble, or there has been fatigue or a chill, warm liquid and external warmth combine best in this object. The effect of food and the bath was noticed in a child of four months (Case 5). On October 1st, at 10 a.m., the temperature in the axilla before breakfast and the bath was only 97°·8, while in the rectum it was 99°·6; a little later in the day the axillary temperature was 98°·7, that of the rectum 99°·1: the bowels were confined. So that here not only is the general temperature restored to the surface, but it is equalized, for while that taken in the axilla is raised by nearly a whole degree, that in the rectum is lowered by exactly half a degree. The next day, October 2nd, before washing and feeding, the axillary temperature was 97° only, the rectal 98°·6; the bowels had become relaxed. On October 3rd, at 10 a.m., after washing and feeding, 98°·2 was easily obtained in the axilla. On October 4th, the evening was chosen for the same enquiry; before having food and being undressed for the night, the temperature was only 96° in the neck, 97° in the axilla, and 99° in the rectum; later in the evening 98° was obtainable in the neck while the child was asleep. A similar observation was made upon a strong, thriving girl, three months old, (Case 6) where the natural nourishment was supplemented by the bottle. At 5 p.m. the axillary temperature was 97°4, the rectal 99°·1; some little gastric irritation had been set up by the use of farinaceous food. Another observation was made in this case some days after all farinaceous food had been discontinued, when 98° was obtained in the axilla and 98°·3 in the rectum, but this was earlier in the afternoon, not long after a meal and just after a sleep.

Sleep aids powerfully in maintaining the equilibrium of temperature, its effect is obvious in the above instances: when deficient in the day the temperature keeps up, and though its loss at night has been found associated with a low tem-

perature, yet sleep, if long continued and profound, indirectly tends to lower the heat of the body by its influence upon respiration: thus, Case 3, at two months' old, while wakeful, with a pulse of 150 and respiration 50 in the minute at 4 p.m., had a normal surface temperature and one of 99° *in recto;* a day or two after at noon, while in a deep sleep that had lasted two hours, the pulse was 120, the respiration 30 in the minute, and the temperature, below 98° in the neck, was only 98°4 in the rectum.

Respiration has the closest and most important relation to the heat of the body, of which it is the efficient cause; on the establishment of this function an independent temperature is commenced which it continues to maintain and regulate. There is always a certain ratio between the respiration and circulation: at birth the regularity of the fœtal pulse, yielding to the influence of new stimuli, at first becomes greatly accelerated; during sleep it is again down to 120, and may subside to below the fœtal rate during the first two days; the pulse at this time is often as low as 100, but as nourishment becomes more abundant it increases in frequency, and will then frequently be found to be 140 or 150, and the respirations 50 to 60 in the minute.

The respiration varies even more than the pulse; within the first week it has been counted at 80 during one minute and at 40 in the next; shallow breathing may have to be supplemented by yawning, or some imperious want in the economy indicated by crying, an act of great physiological utility. Ordinary quiet respiration in infants has a peculiar rhythm, consisting of a series of fifteen or twenty short pants, with pauses at every quarter or half second, calling to mind the rhythmical contractions of the young jelly fish when separated from the narrow pedicle which held it to the parent polype: there is the same regular action of the newly acquired power and the same short pauses, as if at first fatigue necessitated rest.

Notwithstanding the readiness with which the breathing and pulse vary in infancy under the slightest exciting causes, they maintain a relation to each other which is special to the

early period of infancy, and differs from the ordinary ratio of childhood and adult age; there is also either an innate or readily acquired habitual difference in the rate and ratio of these acts in different individuals. The class difference which demands attention is, first, that in early infancy the ratio of the pulse to the breathing is only *three to one,* it may be even less; and next, when this is steadying down to the more mature ratio of *four to one,* any causes that quicken the rate also increase the ratio. The period to which these signs of infancy-proper may continue, varies; the first, characteristic of the earlier months of infancy may alter at three or four months, or continue beyond the second year; this persistency of the infantile condition is generally associated with debility, and may be traceable from this cause for a year or two longer; the second characterises what is known as the period of dentition, but it has no special dependance upon the appearance of the teeth; it is connected with rapid development, when change is active, the breathing is quickened that the temperature may be maintained.

The normal rate for the first few months of infancy is, pulse 120, respiration 40 in the minute. A child, five months old, (Case 7), while at the breast has a pulse of 104 and respiration 26 in the minute; soon after the pulse becomes 120 and the respiration 40 from some disturbing cause other than the teeth; when this is over, (three weeks from the first observation), the pulse was 100 and the respiration 25 at least during sleep.

It is not until the child is a year, or year and a half old that the formula "pulse 100, respiration 24," which prevails from the second to the seventh year, is generally found, and then with the greatest variations; these depend less upon the state of dentition than upon individual peculiarities, as will be seen: a child of a year old (Case 8) with a pulse of 120 and respiration 30, has this rate somewhat diminished (it was reduced to 88 and 20 on one day from diarrhœa) in the next month while cutting two double teeth; another child (Case 9) of a year and a quarter, with only three incisor teeth, has also pulse 120, respiration 30; of two children, each fourteen

months old, both of rapid growth, the one (Case 10) forward, the other (Case 11) backward with the teeth, each had the pulse 120, and respiration 40; one of these, a boy (Case 10) at a year and a quarter, when all but the last four molar teeth were through, has pulse 100, respiration 24; another boy (Case 12) of two and half years, backward with his teeth, has exactly the same, while a third, (Case 13), two years and eight months old, with all his teeth, but in a low state of nutrition, has a pulse of 120 and respiration of 30. Case 13 and Cases 8 and 11 had a somewhat low temperature; Cases 9 and 10 had high temperatures, which in the first was sometimes, and in the last frequently 99°: six months afterwards this child has measles, after which the temperature is low, and the pulse-respiration ratio again becomes 120 and 30 in the minute, and continues so for some weeks.

High temperature and quick respiration are associated with rapid growth. Case 10, at fourteen months, was 33 inches in height; Case 12, up to two years old had the respiration generally 30 in the minute, he had then grown 2½ inches in less than six months. In this child the respiration while 24 in the day was still 22 during sleep. Other children, two years old, with a respiration of 22 in the day have had it 18 in the night; it has been found as low as 15 at midnight in a boy of seven years old.

The individual differences which in after life may become permanent are less confirmed in infancy if not altogether accidental, thus the infant (Case 5) with a pulse as low as 100 when three days old, had also at three weeks old a pulse of only 110 and a respiration of 30, yet at three months, the temperature being both times 99° interiorly, the pulse is 130 and the respiration 40, the difference being from some addition made to the food, which was not over abundant while the child was suckled exclusively; the infant (Case 4) with a superabundance of breast-milk had a pulse of 140 and respiration of 50, the temperature containing from 98°6 to 99°. Only in some of the cases when a frequency of the pulse and respiration has continued through the second year has the infantile rate been also quick. In other cases this

quickness has existed during a few months only, and these times of rapid growth, of which it is indeed a concomitant; and though, as before mentioned, often associated with other conditions, is of itself no indication of pulmonary disorder.

The nervous system probably exercises an influence underlying all these varying conditions, harmonising all the stimuli both from within and without the individual, and tending, as long as its function is unimpaired, to preserve an equability of temperature amid ever changing circumstances. The pulse may vary with the slightest exciting causes, and the respiration with the different states of weakness or want in the body, but the temperature remains the same: the great object seems to be that the elements out of which the phenomena of life are being evolved should be maintained in one constant physical state, of which an even temperature is an important condition. Hence it is that the variations in the bodily temperature become so valuable an indication of disease, in the adult more certain than the variations of the pulse; but in infancy, when the pulse and respiration taken together are even less trustworthy, it is satisfactory to find one condition of the body remaining so far constant (varying only within certain limits, and with certain ascertainable changes in the system), as to be a guide both in our estimate of health, and in our diagnosis of disease.

The extremes of temperature coexist with lesions of the nervous system. Concussion of the brain and shock are associated with exceptionally low temperature. Dr. Hermann Weber[1] has recently shown the connection of certain diseases of the brain with great elevation of temperature, and adduces a case from Sir Benjamin Brodie where this was occasioned by injury to the medulla oblongata. I am indebted to Dr. J. Russell Reynolds for an instance in which, from an injury of the lower part of the spinal cord and complete paraplegia, the temperature of the paralysed parts was considerably above that of the rest of the body. Under my observation exceptionally low temperature occurred in a

[1] 'Transactions of the Clinical Society,' vol. i, p. 21.

case of puerperal convulsions, and exceptionally high temperature in a condition bordering upon puerperal mania.[1] So in infants there are certain convulsive disorders with diminution of temperature as their diagnostic mark—laryngismus stridulus for example. There are others which happen only with great elevations of temperature, such as those which mark the ingress and culmination of some of the exanthemata, where the occurrence of convulsions in infancy shews a certain parallel to, if it does not replace the delirium of older persons and children.

The close relation of nervous phenomena to temperature has an extended significance. Where the nervous centres are themselves the seat of disease it is to be apprehended that a fallacy may arise in the temperature variations ordinarily met with. From two or three cases that have come under my notice, it seems questionable whether pressure from tubercle or other causes may not, at a certain point, either prevent the temperature variation proper to tuberculosis, or interfere with the rise of temperature that would otherwise be occasioned. One of these cases, an adult, characterised by a low temperature throughout, had cancerous tumour of the cerebrum.

The case of paraplegia mentioned above is one of the few in which part of the body has its temperature raised without a corresponding elevation in the general temperature; lesion of the sympathetic, arresting its power to cause contraction of the blood-vessels was doubtless concerned in the high temperature of the lower extremities in this case, where there was also rapid ulceration of the integument. Exhaustion of the nervous supply of a part affected with inflammation or suppuration of long standing, may be the cause of the temperature often being found to be considerably greater there than in the corresponding part of the body, and sometimes probably in excess of that of the interior.

[1] Obstetrical Society's 'Transactions,' vol. ix, p. 129, convulsions preceded delivery in Case 12. In Case 11, besides insomnolency, there were periods of temporary excitement, with delusions.

The greatest difference between a local and general temperature met with in infancy has not exceeded half a degree, and this under exceptional circumstances. An infant, a fortnight old, on the tenth day after vaccination had secondary pustules on the arm, which kept up much irritation and discharge, the general temperature, fluctuating at this time from a little below 98° to nearly 99°, was easily depressed by exposure, or raised by food; during five days, while the arm was still red and secreting a good deal of thin matter, the temperature in the axilla of the arm affected was higher than that of the rectum, when this was 97°8 that was 98°3; and after food, while it was 98°8 in the axilla it was 98°3 in the rectum; the descent of the fæces reduced, but did not obviate this discrepancy.

There is a lowering of temperature after all the acute febrile diseases, and a liability of it to be easily depressed during convalescence; this has been pointed out by Dr. Ringer[1] and is owing to the interference with nutrition, as well as the waste of tissue thus occasioned: only those who follow temperature variations carefully can be sufficiently impressed with this truth; it obtains in the slighter ailments of children as well as in the more severe. It is well marked after vaccination, and even after a day or two of infantile diarrhœa. In one such case, occasioned by excess or error in feeding, and not treated by medicine, though the temperature *in recto* never exceeded 99°, there was a lower range of temperature than usual for five days after, with only 98° *in recto* on one of them.

A depression of temperature in infancy is of more immediate practical significance than the slighter elevations, for while it excludes the idea of any acute or special disease existing, it points at once to the condition requiring remedy, namely bad nutrition. This may occur while the infant is being suckled if the milk be deficient in nutritious quality, as well as in Case 3, when from absence of breast-milk the temperature, once as low as 95°, was kept down to 97°. Even in older children when suckled for too long a period,

[1] Reynolds' 'System of Medicine,' vol. i, p. 416.

or when oatmeal or slops, on the Scotch and French plans, are substituted for milk and bread and butter, the same thing happens: a girl, aged one year and eight months, brought up on the latter plan, has eczema of head with extensive suppuration of the lymphatic glands of the neck; the temperature nowhere was above 97°. This child had twelve teeth, and some little trouble from them.

The irritation of teething may have some positive effect in diminishing temperature; this has been found to be low even when there was restlessness at night with a feeling of heat on the head and skin. Flatulence in young infants is a frequent cause of disturbed rest and low temperature. Spasmodic affections, tooth-rash, bronchial râles, and diarrhœa if from tooth irritation and defective nutrition combined, are found associated with a low degree of temperature. During dentition, croupy attacks closely resembling true croup in all external characters, may thus be at once distinguished and relieved.

In cases of so-called "irritation from teething" when the temperature is much elevated, and this may happen in those suffering from the most defective nutrition, some other cause than mere tooth irritation must be looked for; in this way constipation, catarrh, either of pulmonary or gastric mucous membrane, enlarged cervical glands, slight enlargement of the glandulæ concatenatæ, or even otitis may be found; and in these states of system, with great mobility of nervous system, a very high temperature is quickly reached, 100° to 101° (Case 14) is frequently met with, 102·3° (Case 14) has occurred, and even 103°; though this quickly subside, and the complication present call for no grave prognosis, it is to be borne in mind that the high temperature if not enough to cause convulsions, may through exposure or want of care readily lead to some serious complication; indeed, such elevation of temperature as significantly points to the necessity for rest in bed, as does the opposite condition to the improvement of the diet.

In infantile diarrhœa, the temperature taken in the rectum is a valuable aid both to diagnosis and treatment. A child,

(Case 16) fourteen months old, with sudden diarrhœa and thirst, cutting the lower molars, pulse 100, respiration 20, has a rectal temperature of only 98°. In Case 8, though the skin felt hot, and the anus was excoriated from the diarrhœa, the temperature in recto was 98°·6; a little girl, ten months old (Case 17) cutting the lower incisors, has diarrhœa in the morning and cough at night, pulse 140, respiration 40, has the temperature in recto 98°·3. A child, six months old, (Case 18) from improper feeding, has severe diarrhœa for three or four days, the rectal temperature continues at 99°, once only being 99°·3. Contrasting strongly with these is Case 19, occurring at the same time as the last, in the summer, the child four months old has diarrhœa, not so severe apparently at first, but the rectal temperature was 102°·5, and all the characters of choleraic diarrhœa eventually declared themselves; on the fifth and sixth days the temperature was 104° in the rectum, though the surface was with difficulty kept warm; on the eighth day the rectal temperature was 103°, after which a gradual diminution occurred; the child died on the fourteenth day. In the numerous cases of serous or choleraic diarrhœa among children occurring last July and August, this way of noting the temperature was also of use in estimating the gravity of the seizures, and sometimes in prognosticating recovery. A very delicate infant, a fortnight old, with an attack of this kind, had a temperature of 101°, and for three days it was 100°·5 or more; on the fourth day there was a diminution to 99°·2, and on the fifth, though the child seemed as ill as possible, and the returning urinary secretion was much mixed with blood, the temperature being 98°·6 on that day, and 98°·4 on the next, gave hopes of recovery, which the result justified.

The high temperature characterising the acute specific diseases, is as marked in cholera and diphtheria as in measles and scarlet fever, and in doubtful cases often becomes a trustworthy agent of diagnosis. In the anomalous cases of Scarlet fever likely to arise in an epidemic as widely diffused as the present, some of the doubtful cases might be recog-

nised by the thermometer, which otherwise would be in danger of being overlooked; and it is hardly too much to say that in this way fatal consequences have been arrested.

A child one year and a quarter old (Case 20) had been restless for two nights, and had an evanescent eruption supposed to be tooth-rash; the child was running about the room, pale, with no trace of rash, and apparently cheerful and cool; the temperature was 102° on the surface, and in the evening became 103°, the rectal temperature was 104°. Warmth and rest enabled the rash to reappear; there was slight throat affection at first, which afterwards became troublesome, and the illness was not over for two months.

In Diphtheria, valuable time is often lost from the first few days of high temperature being overlooked. In Scarlet fever the high temperature is so quickly followed by the rash, that the necessary care can at once be taken. In both, the period of illness as measured by temperature, is somewhat longer than has been stated; in mild cases pyrexia only lasts five days, in some the temperature begins to subside on the surface before the rash disappears, and frequently becomes considerably less when that has faded, yet it may continue to be as high, or higher, in the rectum for a day or two longer, and may not subside till the tenth or twelfth day, after which the existence of certain complications will send it up again. An important point can here be decided by temperature. If no kidney disease have been set up, or be now existent, albuminuria may continue in considerable quantity (apparently from the blood-state alone), without increase of temperature, whereas, the appearance of albuminuria has been marked by a considerable increase of temperature where there has been reason to suspect lesion of the kidney. In one instance (Case 24), casts of renal tubes were found in the urine when there was no albumen.

The period of incubation for scarlet fever is probably five days; it may be less: the longest period to my knowledge is eight days, in the case which follows. No marked temperature change has yet been detected until the day preceding the rash; there may have been a day or two

of heaviness noticed, with perhaps yawning, and even a period of low temperature; just before the more declared symptoms there is excitability or liveliness sometimes with a return of appetite, and it is often remarked how particularly well the child seems; this, of frequent occurrence before the illnesses of children, marks the commencement of the elevation of temperature. A boy (Case 21), æt. 2½ years, removed from an infected house for a week's quarantine would, on the eighth morning, have been pronounced unusually well, except that the axillary temperature, hitherto somewhat below, was found to be slightly above the normal; the bowels had not acted with the usual regularity, by night there was a high temperature, and before morning vomiting and diarrhœa, with tenesmus. The rash was fully out by noon, and that evening and next day the temperature of the surface was 101°, with a very full rash. On the fifth day, the skin, though still very red, had a temperature at noon of only 98°, while in the rectum it was 101°, and at night 102°. This temperature, with the same evening exacerbation, continued till the eighth day: the subsidence was nearly complete on the twelfth day, when there remained only coryza. In a boy, seven years old, (Case 22), the highest axillary temperature was 102°·5 in the evening of the third day; next morning it was only 99, but rose to 101° by four o'clock in the afternoon, the temperature in the rectum continuing to be nearly 102°. On the fifth and sixth days the morning temperature of the surface was just below 99°, that of the rectum over 100, and in the evening 101°.

An evening exacerbation was found throughout the course of scarlet fever. In the case just given, on the eighth day a slight articular affection made the morning temperature 101° and the evening 102°·8; next day these were 101°·2 and 103° respectively. The morning temperature became 99°, and the evening 101°·4 the twelfth day; on the next, these were 99° and 100°·3; on the fifteenth, 99° and 99°·7; it was not till the sixteenth day that a temperature of 98° in the morning, and 98°·5 in the evening, corresponded with an apparent freedom from illness. Sponging the surface during

the very height of the rash in scarlet fever has not only proved a comfortable but a perfectly safe proceeding; at this time its effect in raising the surface temperature and in moderating that of the interior, is at least as great as in health. In a boy of six (Case 23) who had been delicate, the axillary temperature on the second day of the rash of scarlet fever was only 99°·1—it had been 100° the evening before—the rectal temperature was 102°; the surface was sponged at eleven a.m., and before noon 101° was obtained in the axilla; the evening exacerbation was moderated by the same means. The rash continued to be quite as red, but gave less discomfort. Where the difference between the surface temperature and that of the anterior is great, this method might be more frequently adopted; where both are unduly elevated, and not controlled by full doses of quinine, resort might be had to the old remedy of cold affusion.

Scarlet fever, if not always as severe in infancy, may be thoroughly characterised at an early age. A girl (Case 24), æt. $1\frac{1}{3}$ years, had a full and vivid rash during the first week of illness, slight affection of the ear-passages in the second, and some desquamation of the renal epithelium, as well as of the skin, in the third.[1] The disease, in a severe form, proved fatal to an infant whose sister, æt. 4 years, recovered with the loss of the cervical glands by sloughing; this accident also eventually proved fatal to a delicate girl of five years, who suffered convulsions with the first appearance of the rash.

The highest temperature noted during scarlet fever has been 104°·5, in a boy, æt. $9\frac{1}{2}$ years, on the third and fourth days of the illness; this may have been exceeded during the intervening night, but the next night, when there was active delirium, 104° could not be obtained on the surface. The temperature was 103° in this case till the eighth day, 102°

[1] During the passage of these sheets through the press scarlatina has been met with, preceded by thrush, in an infant (Case 31) not quite four weeks old; the temperature at the height of the rash reached 102°; it was subsiding on the fourth day before the rash had quite disappeared; a slight increase marked an affection of the ears; recovery perfect.

on the ninth and tenth, and in two days more became normal.

In Measles a temperature of 104° has been met with just before the height of the rash (Case 25) in a boy of seven years old, with slight delirium, but no other bad symptom. A boy of nine has much nocturnal delirium, with a temperature of 104°·1 in the axilla; this was on the fifth day of illness, and at the height of the rash; the next day there was diarrhœa and a temperature of 101°. Another boy, æt. 12, the third day of illness has a temperature of 104°·6 on the first appearance of the rash; there was diarrhœa, but very slight delirium; a full rash with subsidence of temperature, and favorable progress with great depression of temperature after the sixth day. A boy of five (Case 26) has 103°·5 on the third day, before the rash is fully out; on the fourth, with a full rash, the temperature is 102°·4, quite a degree less than the day before the eruption was complete; the pulse also subsided from 140 to 120, the respirations 30 on both days, increased to 36 in the minute on the next day, when the temperature continued to be as high as 102°; on the sixth day the temperature falls while the rash is at its fullest; and while still quite red on the seventh day, the temperature is only 98°, the convalescence being rapid and uninterrupted. In the elder boy (Case 25) some râles were heard at the base of the lung on the eighth day during the depression of temperature; these disappeared under the use of stimulants, and recovery was equally rapid.

Convulsions occurring before the appearance of the rash, proved fatal to a weakly boy six and a half years old. He is ill, and complains of his throat; on the second day the temperature is 104°·5, the convulsions begin towards night; next day death comes before there are any signs of the eruption. A sister, older, and two brothers, younger, go through measles favorably in the same house at the same time; six months after they are all carried off by diphtheria.

Convulsions occurred on the appearance of the rash, with recovery, in a stout boy one year and eight months old (Case 10) when convalescent from hooping cough, and troubled with

the last four molars at the gum. Measles having broken out in the family, this child was removed from the house, carefully isolated, and watched. Ten days afterwards a slight elevation of temperature (99° in the axilla) was noted at night, by morning this was 100°, the cervical glands were perceptibly enlarged, the child was sickening and was restless at night; this would have been called the first day of the illness. On the next day, the second, there are spots of rash behind the ears and on the shoulders, the temperature is 102°·6. On the third day, at eight a.m., the rash is full upon the face, at noon the body and legs are covered; once during this day the temperature reached 104°, the exact time of this observation not being recorded. Convulsions occur at two p.m., afterwards the rash is paler; next day the temperature is only 99°, but the day after it is again 102°; and though the disease may have been interrupted at its height by the convulsions, this increase of temperature was aided by some amount of pulmonary congestion, which continued through the following day. Convalescence was satisfactory with a low temperature, which was 98° on the ninth day, and afterwards still lower, the pulse and respiration being accelerated and reverting to the infantile type for some weeks (*vide* page 8).

Measles possibly becomes contagious before the characteristic lesion of the skin is established. The skin instead of being as in scarlet fever among the earliest tissues to be affected, shows signs of the disease after the implication of the conjunctival, the pharyngeal, and schneiderian membrane, and not always before that of the larynx and bronchi. A little girl (Case 27) six years old, the sister of the infant last mentioned, who was removed at the same time (November 5) has coryza a day or two without attracting much notice, and has more marked symptoms of measles one day earlier than he (November 14th), when she is sick in the morning and delirious at night; the spots appearing but faintly on the 15th. The temperature is 103°, the rash abundant. On the 16th, temperature 102°, the rash quite as full; 17th, temperature 99°·2, the appetite returning; the pulse 104. It was 140 on the 15th;

respiration at the same time has advanced from 30 to 34 in the minute; there are some bronchial râles, the breathing continuing to be slightly accelerated, and the temperature a little above the usual for a day or two longer. Had the first symptoms been attended to, and the child sent to bed a day or two earlier, it is fair to expect that the ailment would have passed off more easily. Her elder brothers, who had measles, were much with her before the separation, which was effected on the day that they first showed the eruption; whether she caught it from them before the appearance of the rash or no, it is clear that the elder brothers caught the complaint from a boy who had not then the completely developed disease. The two brothers (Cases 25, 26) attended a day-school where this boy resided. He was dull, and kept in the class-room with them on Thursday, October 22nd; they were absent from school the two following days, and on their return, Monday, October 26th, were at once sent home because this boy was in bed with measles. On October 31st the eldest brother is seized with vomiting, but is better next day, when both boys take a long walk and seemed tired. On November 2nd the younger has fever and restlessness in the night, and some spots appeared on the face which were not visible next day, November 3rd; the temperature also subsided to 98°·4 in the axilla, but the pulse remained accelerated; both have the rash out on November 5th, and it is at its height on the 7th—the thermometric crisis occurring a day earlier in the elder boy. This is twelve days from the visit to the school, and as they were in the same class-room it is probable that they contracted the disease from him a day or two before.

Another case of this kind occurred at an excellent day-school under my observation. On March 2nd, 1868, a boy seemed dull at his lessons, and was kept in the class-room throughout the day instead of going home to his dinner as usual; the next day he stayed at home, and on the 4th was known to have measles. Many of the younger boys, from eight to ten years of age, who used this class-room, were either away ill or noticeably ailing on March 12th; one boy who only seemed dull at his lessons on that day had the rash

appearing on the 14th, and on the 16th it was at the height.

When exposure to the source of infection is more continuous a shorter time suffices for the development of the disease, and the period of incubation is then closely approximated to that necessary for the evolution of the rash after inoculation. Exactly this period (seven days) elapsed in one case, where a delicate girl (Case 28) was brought into its midst. This was on January 24th, 1865; on the 26th, there was headache, a slight elevation of temperature, no alteration of pulse; 27th, pulse quickened, elevation of temperature not so marked, conjunctivæ reddened; to keep in bed; 28th, throat red, small spots on temples, does not feel ill; 29th, the spots are slightly raised, not more numerous and not red, restless at night, and temperature higher; 30th, appearance of rash on the face and neck; 31st, rash characteristic, face swollen, chest and body generally spotted, arms and legs as much clear skin as coloured. February 1st, still red, temperature normal, no after consequences. The favorable progress of this case was probably owing to rest in bed during the early stages. Could the signs of ingress always be noted, some of the uncertainty in the appearance of the rash from the first to the sixth day of illness, and as to whether the disease declines on the fourth or seventh day, now found in the best accounts of the disease, would be removed. Moreover, the want of an earlier recognition is the great cause of the spread of the disease. In measles the ailment is frequently well nigh over before it comes under observation. Nearly a fortnight may elapse from the time of exposure to the fully-developed rash. The first temperature change may not be noticeable till five or six days after exposure to infection; then there remain seven days of illness, only five of which are markedly pyrexial. The thermometric crisis occurs just as the rash is at its height. Complication may delay the crisis and keep up the temperature for a few days; the sequelæ are associated with the subsequent low temperature.

Small-pox, by inoculation is developed on the eighth day; taken by infection it does not appear on the skin till the

fourteenth, after two or more days of sharp illness. In one case of a young girl elevation of temperature was noted four days beforehand, this reached 105°·2 the evening before the rash was thrown out. The illness proved fatal.

Vaccination; after a temporary depression of temperature a continuous rise commences on the fourth and fifth days; this suddenly increases on the eighth day, and as suddenly falls. Afterwards the local process may continue active, but the disease is over. There is, too, a tendency to a low temperature afterwards, and this actually accompanies any subsequent eruption, such as the vaccineous roseola.

Varicella once only has been known to begin with convulsions, and this in a weakly boy four years old; the convulsions occurred on the day preceding the eruption, there were no other bad symptoms. The pyrexia often attains a considerable elevation in this disease before the eruption is completed. A healthy, strong lad, twelve years of age, after two or three days' feeling of illness is found with a temperature of 102°, which increases at night and is attended with delirium; the next day some spots of varicella appear, on the third day they are numerous on the back and belly; the temperature in the axilla was at or near 99° from this to the eighth or ninth day, the spots continuing to be red; some of them dried up on the seventh day, when there was slight conjunctivitis. On the tenth day the spots had disappeared, the usual depression of temperature followed; on the eleventh day only 95° could be obtained in the axilla, the thermometer kept under the tongue with closed lips for two minutes only reached 97°·5. In a case of doubtful diagnosis in a weakly young woman the persistence of a temperature of 99½° at the end of the third week seemed to point to variola rather than varicella, though the case on either supposition must have been anomalous.

Mumps comes on with a marked elevation of temperature; it has been found as high as 103° in a child (Case 29) 1¼ year old, just before the greatest swelling of the parotid; there is often a subsidence of temperature by the time the child comes under observation or shortly after, the swelling continuing after the fever (sometimes very slight) is passed: so

that sometimes a boy will complain, with reason, that this is worse than other of his infantile disorders in that he feels hungry but cannot eat. The period of incubation is a long one, probably a fortnight.

Hooping-cough presents more difficulties in tracing thermometrically: its period of incubation may be nearly seven days. A girl, æt. 12, returns home July 25th, while her five younger sisters all have hooping-cough. On August 2nd she has large bronchial rhonchus and the hoop. The diagnosis of hooping-cough in its early stage from influenza or bronchitis in children must be always difficult. There is the same elevation of temperature, and the only point of differentiation to be offered provisionally, is the undue excitement and quickening of the pulse in proportion to the respiration; this point, common to all diseases of the class, may be noticed before, or sometimes with the first cough, often long before the first hoop, and at the same time a rise of almost a degree of temperature may be noticed.[1] Purpura and some other dyscrasiæ quicken the pulse, but do not elevate the temperature. Bronchitis, which elevates the temperature, unduly accelerates the respiration. Hooping-cough is also attended with a quickened respiration after the first day or two of illness; when the disease is fully established any rise of temperature then occurring must be referable to pulmonary complication, in every case where this has been noted it was owing, and in proportion to, the lesion of lung present; there may be serious impediment to respiration, as in the apneumatosis so well inquired into by Dr. Graily Hewitt, without at first producing a corresponding temperature change. When there is much impediment to respiration convulsions are imminent, and it is not too much to say that convulsions so frequently fatal in hooping-cough are always owing to the pulmonary implication. There may at the time be a greater elevation of temperature than the state of the

[1] In these diseases, at this stage, the use of sulphurous acid spray on Dr. Dewar's plan is to be recommended. Next to the power of a more early recognition of infectious diseases, some means of arresting them in their earliest stage is necessary to their extirpation.

lung generally produces, but for the relief of this condition, it is the respiration and not the nervous system that is first to receive attention.

A child (Case 30) eleven months old, eight or ten days with hooping-cough, is suddenly febrile, with increase of cough at night, and short breath; next day convulsions occur, a leech-bite on the temple had been bleeding some hours when the child came under observation; there was great pallor, and the fontanelle was depressed. Pneumonia, not far advanced, existed in the left lung. Before giving an enema of weak extract of meat and brandy, the temperature in the rectum was found to be 103°·6; next day the temperature in recto was 104°, the day after 103°, after which the pneumonia disappeared; the chest-walls were not collapsed; and now, though the respiration was relieved, the convulsions would sometimes continue for more than an hour. It was noticed that a convulsion took the place of a hoop, and was kept up by spasm of the glottis. The child was then held face downwards over a basin, cold water poured on to the nape and vertex, air was soon drawn into the chest, mucus expelled from the mouth, the attack thus cut short, and the child made a good recovery.

A parallel is again here noticeable between the convulsions produced by this condition in the infant, and the delirium so constantly met with in the adult, where there is either sudden congestion of the lung or pneumonia. The great loss of blood in this case did not affect the pneumonia, though in its early stage; and what is still more worthy of note is that it did not in any way tend to reduce the pathognomonic temperature; indeed, this was somewhat higher than usual, though at the same time the system seemed nearly exsanguine.

There is one form of catarrh essentially infectious, which comes on with an elevation of temperature; this often amounting in young children to 100°, before any complication, except slight enlargement of the cervical glands, can be detected; this has been found associated with influenza, and herpetic sore throat in different members of the same family,

and is difficult to distinguish at first from the onset of the exanthemata or of hooping-cough.

The spasmodic cough, occurring at night in children of low nutrition, or suffering from teeth, is readily distinguishable by the low temperature from the ingress of hooping-cough; a point of some importance among young children.

Thrush, or muguet, has been found associated with either extreme of temperature; in the one condition (Case 3) pointing to the want of suitable nutrition, with a good prospect of recovery, which would be less hopeful were the temperature to rise; in the other the prospect of recovery varies with the nature of the illness and the condition of the patient. At the commencement of a malady (Case 31) its presence need not prejudice the prognosis, and points then, as in cases where but little temperature change is met with, to the removing such articles of diet as the child cannot digest, and to the neutralizing the acid state of the mouth existing, when the vegetation and increase of the *Oidium albicans*, of which the white spots consist, is impossible.

Bronchitis may cause an elevation of temperature to 100°, and reduce the pulse ratio below three to one. In children over two years of age the pulse and respiration ratio may, as in adults, be a guide to pulmonary congestion or pneumonia, of which latter state the ratio of two to one is no doubt pathognomonic; but in infants, little more than the extreme disturbance of this relation can be made out. Besides the physical signs of these disorders, we have for our guidance the greater elevation of temperature, which, if a small part of the lung tissue be implicated, will often rise to 103°, or higher. As high a degree of temperature may exist for a day or two in idiopathic croup. In croupal diphtheria the temperature may or may not be so high, but it continues near 100° for a much longer period, possibly to the tenth or twelfth day, even in extreme conditions of apnœa.

Meningitis in an infant four months old, had with the earliest convulsive twitches a temperature of 100°; this was 101° before evening, next morning it was 103°·6 in the axilla and increased to 104°; death on the third day.

In taking these observations, it is necessary that the thermometer should have a small bulb, and that it should be completely covered by, and in contact with the surface where it is applied. Except in very young infants the axilla is the most convenient place, and the thermometer is best introduced from behind; on raising the arm two axillary folds are seen, the thoracic one should receive the bulb of the instrument, and the arm be then turned and held down for two or three minutes; in this way a temperature may often be obtained within half a degree of that of the interior of the body. In the folds of skin around the neck of a well-nourished infant a similar result may be obtained; indeed, a fold of skin sufficient to cover the bulb of the thermometer at any part of the surface which has not been unduly exposed, will afford useful indications,—even the readiness with which the temperature is obtained may be of some diagnostic value.

In conclusion, it is hoped that these observations may be found to have a practical relation to the health of infants; and that this method of observing may prove a definite aid to our means of investigating their diseases; while the facts brought together may not be without value, as affording elements of comparison, to other observers.

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